

The AUTOMOBILE

Middle West Crops Presage Increased Car Sales

**Automobile Registrations Make Rapid Gains—
Wheat and Corn Bring Unprecedented Prosperity
to Farmers—Prices Higher for Lead, Zinc and Oil
—Livestock Booms with High Prices for Cattle**

KANSAS CITY, MO., Sept. 11—If good crops and high prices make for good times, the West never faced a period of greater prosperity. The reasons are: The second greatest wheat crop in the history of the West. The second largest of all corn crops in the making, depending only on the late frosts in States north of Kansas. A great impetus in the oil industry, due to a rise in price. Big prices for lead and zinc. The highest prices ever paid at this season of the year for sheep and lambs. High prices for cattle. A heavy demand for horses and mules, and double prices due to the exportation of 425,000 horses since the war began. Bank deposits greater than last year, due to the sale of livestock, farm and mineral products to supply foreign demands therefor. A thriving milling industry due to war exports. Unusually fine pastures, due to a rainy summer. Freedom from labor troubles. The general employment of all skilled and unskilled labor.

Record Corn Crop

The big rains that came to the West just as the wheat harvest was beginning cut the winter wheat crop in the big grain States by a tremendous amount, amounting in Kansas alone to 60,-

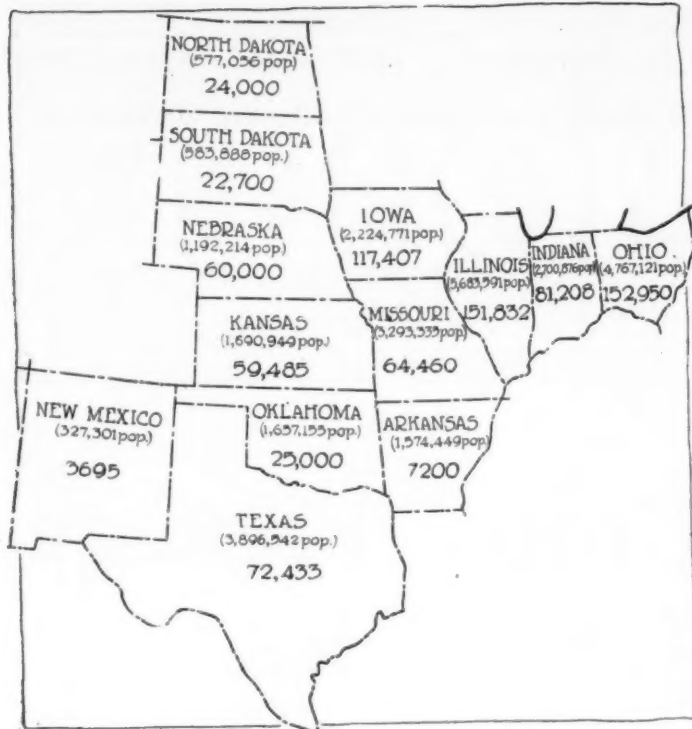
000,000 bu., but the same heavy precipitation is giving to these States the greatest corn crop of their history.

The losses in winter wheat will be offset by the gains in corn which could not have resulted in a year of hot winds and high temperatures. Automobile dealers in the West have been watching reductions in the wheat estimate during the last month with some chagrin, although the Southwest will have a crop exceeded only by one other, that of last year. But they failed generally to take into account that the reductions of wheat have meant big increases in corn and the farmer makes more money from corn than he does from wheat, although it is not such a ready money crop. -And the spring wheat crop in the northern tier of

western States is the greatest in their history. Kansas estimates for wheat at the beginning of the season were for 160,000,000 bu. of wheat and as late as the latter part of July J. C. Mohler, of the Kansas Agricultural Department looked for 135,000,000 bu. of wheat. This month, however, Mr. Mohler, with reports from all counties on threshing, says Kansas will raise 100,000,000 bu. of wheat, which is, however, a bumper crop even for Kansas.

Eleven Reasons for Prosperity in the West

- 1—Second greatest wheat crop in West's history.
- 2—Second largest of all corn crops in the making.
- 3—Oil industry given impetus by higher prices.
- 4—Lead and zinc mines rushed by demand due to war.
- 5—Record prices for sheep and lambs at this season.
- 6—Cattle selling for prices steadily above normal.
- 7—Double prices for horses and mules for war purposes.
- 8—Increased bank deposits due to large foreign business.
- 9—Milling industry thrives—Business steadily gaining.
- 10—Unusually fine pastures due to a rainy summer.
- 11—Employment plentiful—Freedom from labor troubles.



Map of thirteen of the central western States, showing the comparative population and registration of automobiles. This section of the country has been making tremendous gains in car registration during the past two years and the record crops now being harvested presage a still greater advance in this respect

After the big wheat crop of last year, thousands of mortgages were paid off or reduced in the Southwest, so that the big corn returns this year and the wheat crop which would be a record breaker for any year except last year will put the farmer in splendid condition and give him money to spend he would not otherwise have. Illinois, however, will come forward, the latest returns indicate, with an increased wheat yield, while Oklahoma will reach its original estimate of 40,000,000 bu. The loss will be considerable in Kansas, Missouri and Nebraska, but the panhandle of Texas, as big as most other States, will show a tremendous increase in its wheat production.

Corn—2,900,000,000 Bushels

The size of the corn crop is largely dependent upon a late growing season. If frosts hold off until the middle of October in the Dakotas and Nebraska and later in the States further south and east, the corn crop of the country will be second only to that of 1912, when 3,124,000,000 bu. were raised. This year's crop should exceed 2,900,000,000 bu., 230,000,000 bu. more than last year. The corn crop is practically made in Oklahoma, Texas and the South generally and will make a high record in these States. The southern planters diverted several million acres of cotton land this year to corn, 25 per cent more than last year and they are going to be in better shape than when the war was tearing cotton prices to pieces.

There is slight danger of frost in Kansas. That State will have a record crop, although the acreage is smaller than in the last twenty years. It was this small acreage that blinded the eyes of grain men generally to the possibilities of the corn crop and under no other conditions could it have happened except where rain fell practically every few days through the corn belt, all through the time that generally brings hot winds and high temperatures.

Frost Only Danger

This is true also in all the big corn States. Well informed grain men say that if there is no frost damage to corn,

yields in the big corn States will be practically as follows:

State	This Year Bu.	Last Year Bu.
Illinois	400,000,000	300,000,000
Iowa	350,000,000	390,000,000
Nebraska	200,000,000	174,000,000
Kansas	140,000,000	108,000,000
Missouri	190,000,000	158,000,000
Indiana	200,000,000	163,000,000
Ohio	150,000,000	142,000,000
Oklahoma	120,000,000	50,000,000
Texas	175,000,000	125,000,000

Livestock Booms

The livestock industry everywhere in the western States is in first class condition and most of the western States have recovered from their scare about the foot-and-mouth disease and lifted their quarantines. While this scare existed it upset one of the greatest industries of the West. Prices are high for cattle, horses and sheep and fair for hogs. The steady sale of horses for war purposes has raised the price of all breeds of horses in the West from 50 to 100 per cent since the war began a year ago. And the demand continues. Since a year ago 425,000 horses have been exported for war purposes.

The West never had finer pastures or crops of hay and all the minor feeding stuffs such as kafir and the various forms of feeding sorghums which are an important factor in farm prosperity in the western Dakotas, western Nebraska, western Kansas, Oklahoma and the Texas panhandle.

Kansas City Gains

Just what the livestock market is to the West cannot be understood by eastern men who have not had experience in the West, but thousands of men are employed in the central markets themselves from livestock commission brokers and cattle money lenders to the packing house laborers. Omaha and Kansas City are largely dependent on the livestock market for their prosperity, so that figures from the livestock yards of these two cities are of especial interest right now. In the month just ended, 9381 carloads of live stock were received at the Kansas City Stock Yards. This is an increase of 981 cars, or 11 per cent over the receipts in August, 1914, and represents a gain of 10,800 cattle, 26,200 hogs, 34,200 sheep and 938 horses.

Kansas City and Omaha, the big western markets, show increases in all departments for the month just ended. In Chicago there were increases in cattle and hogs and a decrease in sheep. St. Louis reported decreases in cattle, hogs and sheep.

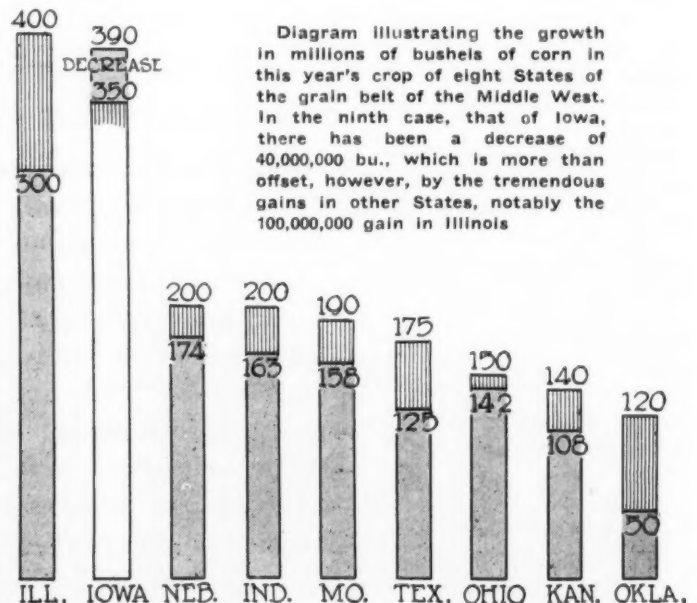


Diagram illustrating the growth in millions of bushels of corn in this year's crop of eight States of the grain belt of the Middle West. In the ninth case, that of Iowa, there has been a decrease of 40,000,000 bu., which is more than offset, however, by the tremendous gains in other States, notably the 100,000,000 gain in Illinois

In sheep, the most interesting feature in years is developing and is reflected in increased receipts in Kansas City and Omaha, and a big drop in the Chicago supply. Here sheep increased 31 per cent over a year ago and in Omaha there was an increase of 13 per cent.

Official reports at the Kansas City Stock Yards for August were: 173,636 cattle; 12,197 calves; 142,729 hogs; 145,598 sheep, 3030 horses.

Receipts of cattle, calves included, hogs and sheep in the five big western markets are here shown as an index to western prosperity. Receipts in eight months this year and last:

Cattle	Five Western Markets
Eight months 1915	4,139,100
Eight months 1914	3,992,250
Increase	146,850
Hogs	
Eight months 1915	11,393,850
Eight months 1914	10,023,450
Increase	1,370,400
Sheep	
Eight months 1915	5,854,900
Eight months 1914	7,238,800
Decrease	1,373,900

Lead and Zinc Develop

The lead and zinc district, comprising an important area in Kansas, Oklahoma, Arkansas and Missouri, has come into renewed prosperity in the last few weeks. For a time, in fact, for about ten months after the war broke out, zinc ore was selling for three times what it formerly sold at and then came a sudden slump that sent the price down more than 50 per cent. A revival in price, however, has followed that has put the district into good humor again. Zinc blend sold last week at \$70 to \$86 a ton, where it had sold the week before at \$50 to \$70 and the market was still climbing.

More Cars Registered

Just how important the price of zinc ore is may be understood from the fact it is often said that every other man in southwest Missouri and southeast Kansas owns stock in a zinc mine. Also thousands of investors are represented in the western cities in the thousands of zinc mines in the Joplin district. And while many more investors are represented than appears in the half dozen counties where the mines are located, the effect on the automobile industry may be gaged by the fact that Jasper County, Missouri, in the mining district, has shown an increase alone from 1768 to 2450 cars since the first of the year.

\$25,000,000 in Ores

It means something when it is said that the Kansas-Missouri-Oklahoma-Arkansas lead and zinc district will produce \$25,000,000 of lead and zinc in ores alone. To get the comparison a little better, possibly; all the gold mined in the United States and Alaska in 1913 amounted to only \$88,000,000.

This is a condition that has come about only in the last year and one that will last a year at least and probably longer after the war is over. The cause is simple. Before the outbreak of the war, about one-half of the world's output came from Germany and Belgium. The war has shut down nearly every zinc mine in Germany and Belgium. The trouble in Mexico has cut off production there and the Australian zinc ore can not be smelted in America at a profit, so that the world is dependent on America for zinc.

Brass Demand Great

Now, while the war lessened by one-half the production of zinc, it vastly increased the demand for it, because brass

HOGS - 1915	11,393,850
HOGS - 1914	10,023,450
SHEEP - 1915	5,854,900
SHEEP - 1914	7,238,800
CATTLE - 1915	4,139,100
CATTLE - 1914	3,992,250

Chart indicating the comparative livestock statistics in five western markets for the first 8 months of 1915 and 1914, sheep being the only one to show a decrease

is made of about 50 per cent of zinc. Brass enters into the making of almost every cartridge.

In 1914 the Joplin district produced 257,047 tons of zinc ore, valued at \$9,702,804, which is a little less than \$40 a ton. This year with the increased activity, the output ought to be 300,000 tons, the experts say, and at \$75 a ton this would bring into the district \$22,500,000. This much zinc ore would make 150,000 tons of spelter valued at \$45,000,000.

But zinc ore is not smelted in the Joplin district because of lack of fuel there. It is cheaper to carry the ore to the Kansas districts of cheap fuel than to carry fuel to the zinc districts, so the smelters are in the gas and coal fields.

Everywhere in the zinc fields around Webb City and Joplin are men who are becoming rich, men who a year ago had nothing and are making thousands of dollars a month now with prospects of that income keeping up as long as the war lasts and a year or two afterward, for even after the war ends, it will take a year or two to get the Belgian and German industry on its feet again. Nearly everybody in the Joplin district has some interest in a mine.

Prospective Car Owners

In Webb City and Joplin, the barber who shaves you may have an income of \$100 a week from his one-eighth or one-sixteenth interest in a zinc mine. The waiter who serves you may be getting from \$50 to \$100 a week from his mining interest; and the man in overalls over on the corner, who was a shoveler a year ago earning \$2.50 a day, may have an income now of several hundred or even a thousand dollars a week. There are lots of instances of that kind.

Road Improvement a Factor

These mines of this district produce a grit that makes fine roads and radiating out of Joplin are 600 miles of grit roadway. These roads help to make the automobile industry grow, too. The mines are located all over the district and some of them are twenty miles from a good-sized town so that the automobile is not only a luxury, but a necessity. The light cars are most in demand, but the most expensive kind are also to be seen.

Field Widens in Texas

A territory that the automobile trade is hearing from now and is to hear more from this fall is the panhandle of Texas. This empire, which formerly was given over to the open range and frequented by coyotes and prairie dogs, is being broken up into farms. The present season is the greatest in its history. Wheat is threshing an average of 25 bu. to the acre and forage crops are very luxuriant. It's the panhandle's greatest year since any record of rainfall and crops has been kept.

Amarillo, the commercial center, with a population of about 13,000 has a licensed registry of more than 900 cars of all makes. Its newspapers are carrying expensive automobile advertisements and the smaller towns are rapidly establishing car agencies. This blanket of prosperity extends

(Continued on page 519)

Physical Qualities of Castor Oil

Careful Experiments Determine Densities and Viscosities as Functions of Temperature, Chill Point, Flash Point and Boiling Point

IN order to arrive at a set of scientifically accurate figures on the qualities of castor oil, THE AUTOMOBILE has submitted to the Sibley College of Cornell University a sample of grade AA castor oil as produced by the Baker Castor Oil Co., New York City, for test.

The results of the test are shown in the curve herewith. The experiments were performed by P. G. McVetty, of Sibley College, using formulæ derived by Prof. G. B. Upton for the determination of absolute viscosity. The curve shows the attempt to bring the viscosity readings down to a basis which is absolute and not in the arbitrary scale of any one viscometer. The report of the test is as follows:

Tests have been made to determine the density and viscosity as functions of temperature; also the chill point, flash point, and burning point.

Density of Sample .9599

The density of the sample at 21.0 deg. C. or 69.8 deg. Fahr., was determined by weighing a known volume (200 c.c.) which gave a value of 0.9599, distilled water at 4.0 deg. C. being taken as unity. Also a hydrometer was used to determine the variation of density with temperature, resulting in the following data:

In distilled water at 62.4 deg. Fahr., hydrometer read.	= 0.994
Actual density of water at 62.4 deg. Fahr.	= 0.9989
Constant of hydrometer is then $\frac{0.9989}{0.994}$	= 1.0049

Oil Temp. Deg. Fahr.	Density of Castor Oil Water at 4.0 Deg. C.=Unity Hydrometer Reading	Corrected Density
68.7	0.956	0.961
115.0	0.940	0.945
135.0	0.932	0.937
150.0	0.927	0.932

The hydrometer used had an enclosed thermometer which read to 150 deg. Fahr. This prevented the use of higher temperatures.

As a check on this work, the following data have been taken from "Lubrication and Lubricants," by Archbutt & Deeley, page 185.

Temp. deg. Fahr.	Density
100	0.9473
150	0.9284
212	0.9050

Also at 60 deg. Fahr. the density of a number of samples varied from 0.958 to 0.967, the usual value being 0.962 to 0.963.

Curves have been plotted from both these sets of data and it will be noted that the difference between the two curves is less than half of 1 per cent, while the variation given by Archbutt & Deeley as existing between different samples of the oil is about 1 per cent.

Upton's Formulæ Employed

The determination of *absolute viscosity* from the time readings obtained with practically any form of flow viscometer (viscosimeter) has been made possible by the use of a theoretical equation derived by Prof. G. B. Upton, the peculiarities of any individual instrument being taken care of in the constants of the equation. These constants may be obtained experimentally or computed from the dimensions of the instrument. The following discussion is abridged from a paper by Prof. Upton.

"A flow viscometer does not measure viscosity. It measures the ratio of viscosity to density, at atmospheric pressure, and at the temperature which the fluid possesses as it approaches and runs through the discharge tube of the viscometer. The general form of the equation, connecting the ratio of viscosity to density with the time of flow of a set quantity of fluid from a given viscometer is:

$$\frac{n}{d} = At - \frac{B}{t}$$

in which

n = absolute viscosity in dynes per sq. cm.

d = density at the temperature of measurement.

t = time in seconds for the efflux of a fixed quantity of fluid.

A and B are instrument constants readily found."

In reporting tests on the Engler viscometer it has been customary to use the term "Engler number," which is defined as the ratio of the actual efflux time at any constant temperature for 200 c.c. of the fluid being tested, to the time for the same volume of water at 20 deg. C. Since the Engler number is proportional to time, the general equation may be written:

$$\frac{n}{d} = Ae - \frac{B}{e}$$

in which e is the Engler number.

The following equations are given by Professor Upton for the *average* instrument of each type, and are used in the following computations where the data at hand are insufficient for determining the time constants of the individual instruments:

$$\text{Standard Engler } \frac{n}{d} = 0.0730 e - \frac{0.06294}{e}$$

$$\text{Saybolt Universal } \frac{n}{d} = 0.001930 t - \frac{1.242}{t}$$

$$\text{Redwood } \frac{n}{d} = 0.002322 t - \frac{1.387}{t}$$

Reduce to Absolute Figures

The following data were obtained by test of a sample of the oil in a Standard Engler viscosimeter on March 18 and 22, 1915, and are reduced to absolute viscosities by means of the Upton formula, making allowance for the constants of the instrument used ($e = \frac{t}{52.3}$, for this instrument).

Temp. Deg. Fahr.	Engler Time (t)	Engler Number (e)	0.0730 e	0.06394 / e	n/d	d	n
208.5	144.0	2.76	0.2016	0.02283	0.1788	0.910	0.163
80.0	4150.0	79.40	5.80	0.0008	5.799	0.956	5.55
77.0	4696.0	89.80	6.56	0.0007	6.559	0.958	6.28
73.0	6352.0	121.55	8.87	0.0005	8.87	0.959	8.50

These viscosities have been plotted against temperatures as shown on curve sheet.

To check the above work, and the reliability of Upton's equations in general, all the available data on castor oil viscosities have been collected and plotted on the same curve.

On page 355 of "Lubrication and Lubricants" by Archbutt & Deeley, we find the following data:

"Twenty-three samples of Indian castor oil, tested by Deering and Redwood in the Redwood viscometer required from 1160 to 1190 sec. for the outflow of 50 c.c. at 100 deg. Fahr."

Taking the average time = 1175 sec., we have

$$\frac{n}{d} = 0.002322 \times 1175 - \frac{1.387}{1175} = 2.728$$

From density curve, d at 100 deg. Fahr. = 0.949.
Hence, $n = 0.949 \times 2.728 = 2.59$ at 100 deg. Fahr.

Cites Stratford's Paper

In a paper entitled "How to Test and Use Oils and Greases," by C. W. Stratford, read at the June, 1915, meeting of the Society of Automobile Engineers, is given a curve in which times of efflux from a Saybolt universal viscometer are plotted against temperatures.

The following values have been picked from this curve:

Temp. Deg. Fahr.	Saybolt time Seconds
100	1350
150	300
200	110
250	60+
300	50-

These values reduce to absolute viscosities as follows:

Time, Seconds (t)	0.001930 t	1.242 t	n	Temp., Deg. Fahr.	d	n
1350	2.605	0.00092	2.604	100	0.949	2.471
300	0.579	0.00414	0.575	150	0.931	0.535
110	0.212	0.01130	0.201	200	0.913	0.184
60	0.116	0.02070	0.095	250	0.896	0.085
50	0.0965	0.02484	0.072	300	0.878	0.063

As a check on all the computed values, the following from Archbutt and Deeley have also been plotted.

Temp. Deg. Fahr.	Absolute Viscosity
100	2.729
150	0.605
212	0.169

An inspection of the curve will show that all the data agree very closely, which confirms the accuracy of the method of computation.

Chill Point Not Determined

The *chill point* has not been definitely determined, and it is evident from the attempts that have been made to obtain this value that some special apparatus must be arranged for the purpose. One sample of the oil was kept at a temperature of -4.5 deg. Fahr. for 1 hr. but no apparent solidification resulted. Another sample was cooled below -100 deg. Fahr. by surrounding it with liquid air. This solidified suddenly with the formation of plate-like crystals, probably due to entrained moisture. The subsequent reheating on exposure to the air was too rapid for the determination of the chill point. It is probable that this determination might be made by using carbon dioxide snow. Archbutt and Deeley give ± 0 to 14 deg. Fahr. as the approximate solidifying point. The value obtained depends largely upon the method used.

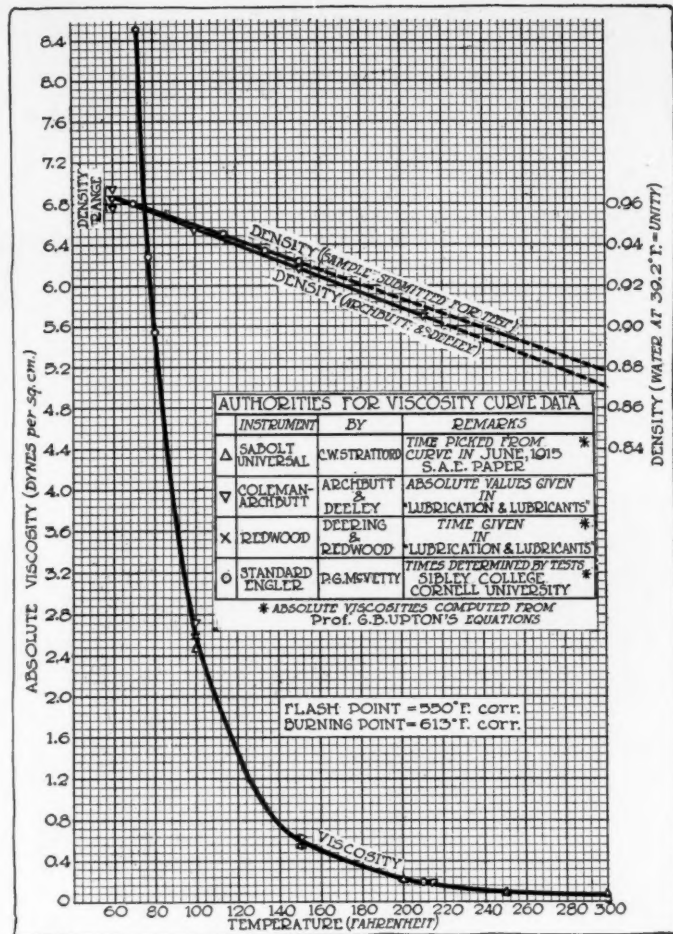
Open Cup Tester Used

The *Flash Point* and *Burning Point* were determined in an open cup tester, using care to avoid air currents across the apparatus. The reason for not using the standard Pensky-Martens instrument was that the temperatures involved were considerably beyond its working range. As the open cup tester does not give close check values, eight tests were made for both flash and burning points and the average of the best readings used. One thermometer was placed in the oil and was used to keep it stirred; another was so placed as to give the mean temperature of the emergent stem of the first. Both were calibrated and the proper corrections applied. From these data were obtained

- Flash point = 550 deg. Fahr. corrected;
- Burning point = 613 deg. Fahr. corrected.

In conclusion, the following points may well be emphasized:

(1) The value of any oil as a lubricant depends upon its viscosity in the working range of temperature. On account of the importance of this property, the viscosity-temperature curve has received more consideration than the other



Curves showing castor oil densities and viscosities as functions of temperature, determined by tests at Sibley College, Cornell University

items. The viscosity values of castor oil are approximately the same as those of a "heavy" petroleum oil, and its lubricating action will be similar to such an oil. The choice of one or the other will then be controlled by considerations of price. Reference may be made to Mr. C. W. Stratford's paper, previously mentioned, for a discussion of this point.

(2) A knowledge of the density of an oil has little practical value. The temperature-density relations have been determined with a fair degree of accuracy because they are necessary for the computation of absolute viscosities.

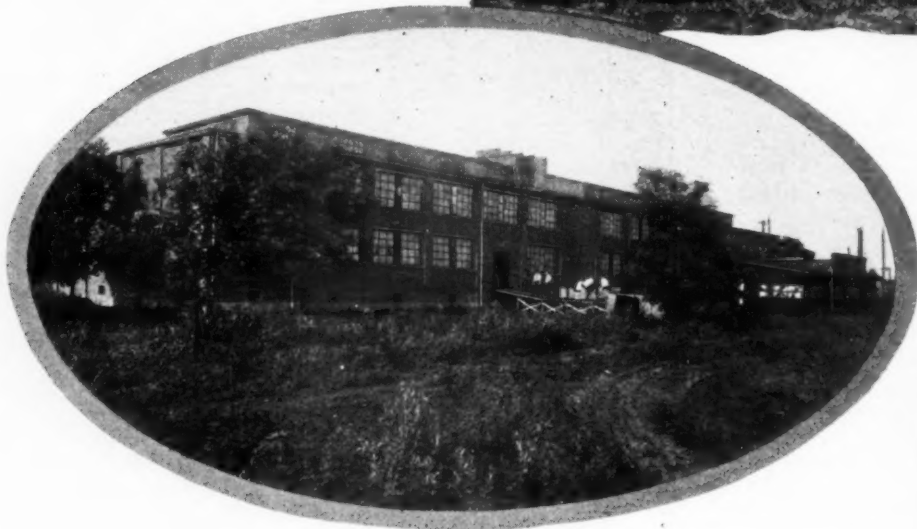
(3) The chill point affects the distribution of the oil to the bearings and the starting of a machine in very cold weather.

(4) The flash and burning points of an oil used for motor cylinder lubrication have practically no importance, if above 300 to 350 deg. Fahr. For a discussion of this point, see the paper by Lieut. G. S. Bryan in the February, 1915, Journal of the American Society of Naval Engineers.

(5) The absolute values obtained in all tests of castor oil may be considerably in error. It is a glyceride and, like glycerine, has the property of absorbing water from the air. On this account, it is evident that both viscosity and density will change with the atmospheric conditions and the time of exposure of the oil to them. Upon heating the oil to determine the change in its properties with temperature, this water is driven off, which causes a change in composition during the test. There is also evidence that the chemical composition changes even when heated only slightly because the oil becomes darker in color. These variations, which cannot well be controlled, may seriously influence the results of any test, but reasonable care has been taken to make the results as nearly accurate as possible.—P. G. McVETTY, Instructor, Experimental Engineering, Cornell.

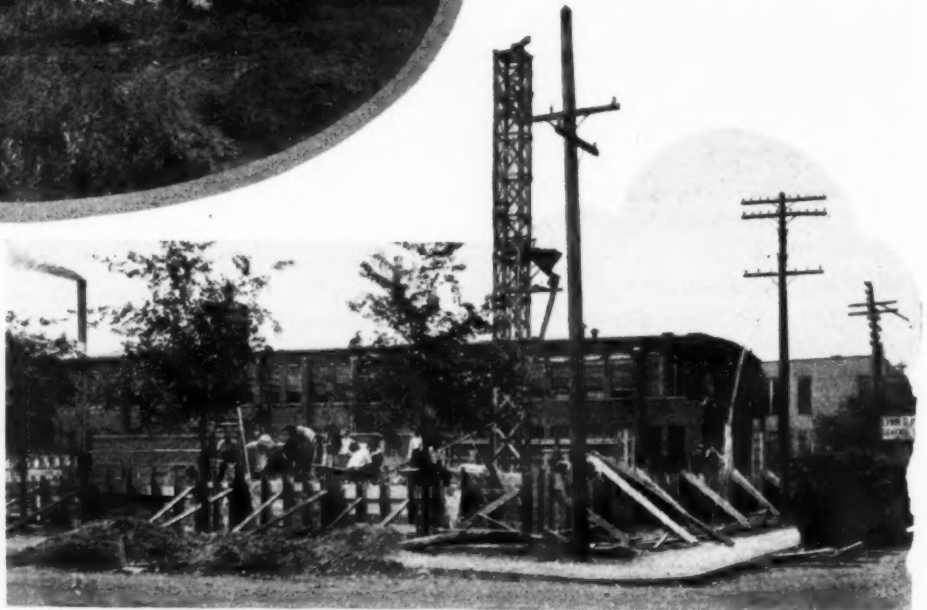
Some Recent Factory Developments

At the right is illustrated the testing trestle in use at the factory of the Wichita Falls Motor Co., Wichita Falls, Tex., with a 27 per cent grade on one side and 18 per cent on the other. This trestle is located just outside the Wichita factory and all Wichita trucks are tested on it in addition to making test runs over the plains.



At the left is illustrated one side of plant No. 2 of the Warner Gear Co., Muncie, Ind., this building having recently been added to the factory equipment of the company. It is a two-story brick structure 60 by 300 ft. and is now in full operation. Another view appears at the bottom right of this page.

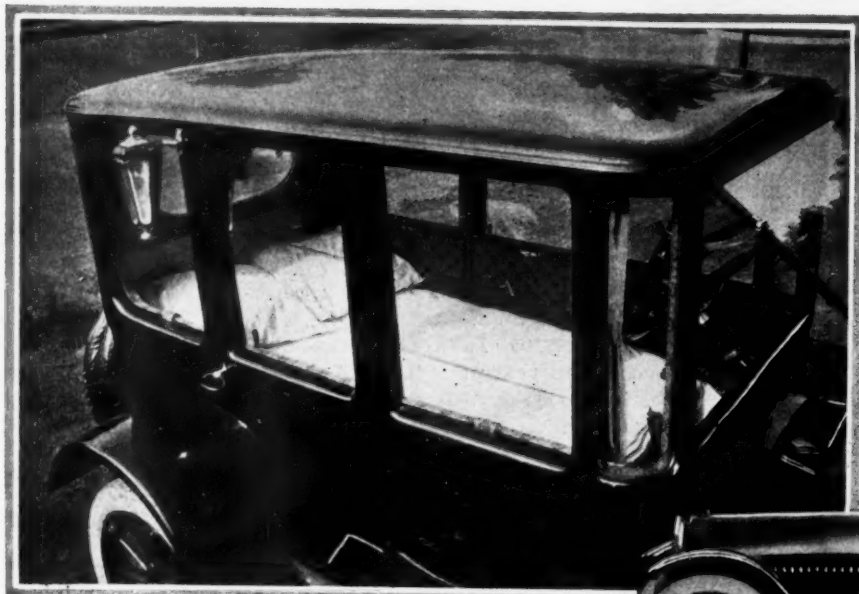
At the right is construction on the new factory buildings erected by the National Motor Vehicle Co., Indianapolis, Ind. One building is 38 by 278 ft., the other is 80 by 400 and both are two stories in height, being of concrete and steel construction and absolutely fireproof. One of the new buildings will include the general offices of the company. The National company's plant now occupies a solid city block. Work is being rushed on the additions.



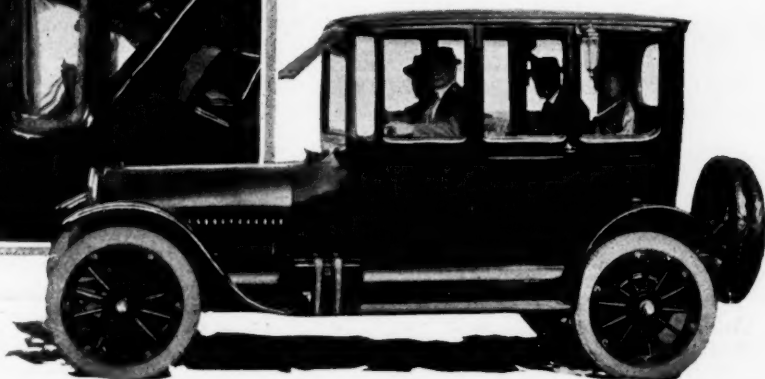
At the left is the assembly plant of the Ford Motor Co. of Louisville, Ky., now being completed so as to be ready for occupancy October 1. It is a four-story steel and concrete structure with basement and sub-basement and trimmed with terra cotta and ornamental brick. Floorspace is 88,000 sq. ft., with 53,500 sq. ft. of window space.

At the right is another view of plant No. 2 of the Warner Gear Co., Muncie, Ind., illustrated in the oval above. With this addition the increased floorspace of the company's plant is 39,000 sq. ft., the total working force being 1200 men on a twenty-three hour basis.





How the sedan looks with the seats converted into berths, rendering it unnecessary to reach any particular point for stopping over night.



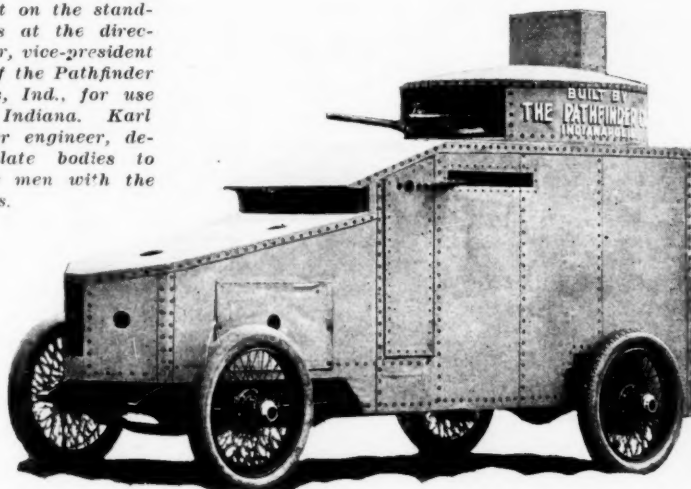
A Studebaker Sleeper For Long Tours

The two illustrations above show the 1916 Studebaker sedan specially designed for S. Sproat of New York City, which is fitted with seats convertible into berths and with the ingeniously constructed compact refrigerator illustrated at the left. With this car Mr. and Mrs. Sproat, who have started on a tour to extend over a period of 2 to 3 months through New England, Canada and the West, are relieved of any dependence upon hotels since they may make their overnight stop where they wish without pushing forward or going back for sleeping or eating



The ingeniously designed, compactly constructed refrigerator which is carried strapped to the left runningboard of the special Studebaker sedan illustrated above.

At the right is illustrated one of the two armored cars built on the standard Pathfinder chassis at the direction of W. E. Stalnaker, vice-president and director of sales of the Pathfinder Company, Indianapolis, Ind., for use in the recent war in Indiana. Karl Feilcke, the Pathfinder engineer, designed these boiler-plate bodies to carry a crew of four men with the usual quick-firing guns.



An interesting method of making a tractor has been originated by A. W. Bell, a resident of Saskatoon, Sask. The car from which the improvised tractor has been made is a 1912 Overland and it was converted into a tractor by the simple arrangement of putting in an extra axle under the frame 2 ft. in front of the rear axle of the car on which were placed two binder wheels. After removing the rear wheels of the car, Mr. Bell replaced them with small sprocket wheels which were connected with larger sprockets on the drive wheels by chains.

Michigan's Six Months' Registrations

First Half of 1915 Shows Over 20,000 More Cars Licensed Than During Entire Year 1914

By Marc Braun

Gasoline Cars							
	Jan.	Feb.	March	April	May	June	Total
Passenger.....	25,343	9,691	22,262	17,942	9,419	6,987	91,683
Commercial....	1,259	170	304	362	248	156	2,499
Total.....	26,602	9,861	22,566	18,304	9,667	7,143	94,182
Foreign.....	20	3	6	5	—	5	39
Total.....	26,622	9,864	22,572	18,309	9,667	7,148	94,221

Electric Vehicles							
	Jan.	Feb.	March	April	May	June	Total
Passenger.....	1,219	93	118	56	44	22	1,552
Commercial....	98	6	—	5	1	1	111
Total.....	1,317	99	118	61	45	23	1,663
Manufacturers' and dealers' cars.....							523

Different Makes	
Total number.....	390
Gasoline passenger cars.....	239
Electric passenger cars.....	24
Gasoline commercial cars.....	102
Electric commercial cars.....	7
Foreign gasoline cars.....	18

AUTOMOBILE licenses numbering 96,368 were issued by the Secretary of State of Michigan from Jan. 1 to June 30, 1915. In those six months 20,046 more cars were registered in Michigan than during 1914.

Taking the State official's records since 1909, when the first official count was taken, it is shown that the half-year record for 1915 is 84,650 licenses ahead of all of 1909, 78,013 more than that of 1910, 68,572 over the 1911 record, 56,999 better than the registrations of 1912, 42,002 beyond the 1913 total and, as stated above, already 20,046 past the total of last year.

Canadian Element Not Counted

In going through the motor vehicle license lists as compiled by the State license department and in making the count of the various, or different cars, no cars credited to Canadian residents or to residents of other States were taken into account, it being the intention to make a record only of the cars owned in the State of Michigan. This will account for the difference of 2106 cars or license numbers when the total as recorded by the Secretary of State and the total as compiled by the writer are compared. The State records give the total number as 98,474.

Among the 96,368 cars counted, there are to be found the makes of 390 different automobile manufacturers, a great many of whom long ago ceased to make automobiles, or have either been absorbed by other concerns, or given up the automobile end of their business.

Of the total of 96,368 cars 94,182 are gasoline driven, and 1663 are electric vehicles. There are 91,644 gasoline passenger cars and 1552 electric vehicles, for passenger use. Commercial cars total 2610 of which 2499 are gasoline trucks

(Continued on page 519)

GASOLINE PASSENGER CARS															
	Jan.	Feb.	Mar.	April	May	June	Total		Jan.	Feb.	Mar.	April	May	June	Total
Abbott.....	178	32	64	40	19	15	348	Colby.....	1	..	..	..	..	..	1
American.....	48	15	30	12	6	5	116	Clermont.....	..	..	1	..	..	..	1
Auburn.....	30	31	70	51	14	15	211	Chicago Coach.....	..	..	..	1	..	..	2
Alpena.....	9	5	20	19	6	3	62	Cornelian.....	..	..	..	..	2	2	4
Anderson.....	18	5	10	19	11	1	64	Dodge.....	16	32	124	188	205	153	718
Alter.....	5	6	18	19	19	86	164	DeTamble.....	4	2	9	4	2	4	25
Allen.....	3	1	4	6	6	3	23	Deal.....	..	..	4	2	..	..	6
Anhut.....	3	5	5	4	2	1	20	Detroit.....	..	..	..	..	..	..	..
Austin.....	6	2	7	2	2	2	21	Dearborn.....	3	2	3	5	3	1	17
Amplex.....	4	..	1	1	..	..	6	Deere.....	..	1	..	..	..	..	1
Aerocar.....	4	..	3	1	3	4	15	Day.....	..	1	1	1	..	..	3
Aurora.....	..	..	1	..	..	..	1	Davis.....	2	..	1	..	..	..	3
Argo.....	..	..	14	3	2	19	38	Demotocar.....	..	..	2	4	5	5	16
Buick.....	1594	617	1880	1472	615	440	6624	Detroit.....	..	..	..	..	..	..	..
Briggs.....	116	46	120	71	39	21	413	Chatham.....	..	..	2	2	..	1	5
Brush.....	54	40	117	180	80	59	530	Dolson.....	..	..	1	2	2	2	7
Briscoe.....	22	7	20	30	27	11	117	Dort.....	..	..	1	5	12	16	34
Blomstrom.....	5	..	6	4	3	..	18	Dawson.....	..	..	1	..	..	..	1
Benham.....	..	2	1	2	..	..	5	Downing.....	..	..	..	1	..	..	1
Badger.....	1	..	..	..	1	..	2	De Luxe.....	..	..	..	..	1	2	3
Baines.....	..	1	..	..	..	..	1	Dragon.....	..	..	..	..	1	1	2
Bergdoll.....	..	..	2	..	2	..	4	Dalton.....	..	..	..	..	1	1	2
Busser.....	..	..	1	..	..	..	1	E-M-F.....	143	91	305	253	87	50	929
Brownell.....	..	1	..	..	..	..	1	Elmore.....	27	14	33	32	26	11	143
Bates.....	..	..	1	..	..	..	1	Everitt.....	31	13	27	30	13	7	121
Black Crow.....	..	..	1	1	..	..	2	Empire.....	15	9	14	15	9	9	71
Cadillac.....	1382	212	437	382	195	105	2713	Elkhart.....	7	2	17	7	1	3	37
Chalmers.....	463	111	190	198	91	63	1116	Enger.....	..	..	..	1	2	2	5
Cherocar.....	311	85	166	129	53	29	773	Ford.....	9613	4304	8880	7316	4126	3040	37,379
Chvrolet.....	140	76	119	99	80	413	657	Franklin.....	66	13	43	61	15	14	212
Cole.....	124	25	47	30	24	12	262	Flanders.....	..	..	..	44	22	24	90
Cutting.....	70	24	62	40	13	11	220	Firestone.....	..	..	..	..	..	1	1
Crow.....	17	18	35	26	21	8	125	Fall.....	..	..	..	1	..	..	1
Case.....	15	4	23	41	10	4	97	Fuller.....	..	..	..	..	3	..	3
Columbia.....	16	..	9	11	3	1	40	Fisher.....	..	..	..	1	..	..	1
Car-Nation.....	2	2	9	5	7	4	29	Frayser-Miller.....	..	..	..	..	..	1	1
Courier.....	10	1	5	3	1	1	21	Grant.....	47	23	48	34	22	21	195
Clark.....	6	5	2	5	1	1	20	Gaylord.....	3	..	1	..	..	..	4
Cunningham.....	6	5	1	2	1	..	15	Great Western.....	..	2	..	3	1	1	7
Cleveland.....	1	1	2	1	1	..	6	Glide.....	8	8	1	3	1	..	21
Chandler.....	38	4	7	21	29	21	120	Garford.....	4	3	4	6	1	2	20
Crescent.....	3	2	2	2	1	..	10	Hupmobile.....	588	181	403	340	123	80	1715
Carhartt.....	9	3	3	4	..	..	19	Hudson.....	617	105	242	205	86	76	1331
Carbin.....	1	..	2	3	1	..	7	Haynes.....	38	18	23	25	15	17	136
Cameron.....	1	..	1	5	3	..	10	Halladay.....	4	8	5	3	2	3	25
Consolidated.....	..	1	..	1	..	1	3	Herreshoff.....	49	14	23	20	9	4	119
Cooley.....	..	1	..	..	..	..	1	Henry.....	10	3	20	11	9	1	54
Campbell.....	..	1	..	..	..	..	1	Havers.....	19	6	10	7	4	..	46
								Henderson.....	7	1	3	1	..	..	12
								Herf-Brooks.....	..	2	4	3	5	..	14
								Huron.....	..	2	4	1	..	..	7
								Homer.....	..	1	..	..	..	..	1
								Holsman.....	..	1	..	..	1	..	2
								Howard.....	..	..	..	1	..	..	1
								Howard.....	..	..	..	2	..	..	3
								Hardford.....	..	..	..	1	..	..	1
								Holier.....	..	..	..	..	1	..	1
								Imperial.....	120	60	134	68	24	15	421
								Interstate.....	6	3	7	3	2	1	22
								Ideal.....	..	..	..	1	..	..	1
								Jackson.....	226	123	225	173	75	56	878
								Jeffery.....	78	28	90	85	45	18	344
								Krit.....	285	109	223	105	59	27	808
								King.....	130	21	53	35	31	19	289
								Kisselkar.....	66	5	20	31	13	8	143
								Keeton.....	5	..	3	2	..	..	11
								Kenmore.....	..	..	1	..	..	..	2
								Kath.....	..	..	1	..	..	..	1
								Kron.....	..	1	..	..	..	..	1
								Knox.....	..	..	..	1	1	..	2
								Knight & Ki- bourne.....	..	..	..	..	1	..	1
								Lozier.....	126	12	15	20	4	9	186
								Little.....	44	22	50	33	7	8	164
								Lion.....	24	15	48	40	10	5	142
								Lambert.....	17	9	34	28	11	9	108
								Locomobile.....	33	2	4	7	8	1	55
								Laxington.....	..	..	..	..	..	..	..
								Howard.....	1	..	1	..	..	..	2
								L-P-C.....	1	..	1	1	1	4	8
								Maxwell.....	426	279	687	563	330	267	2552
								Mitchell-Lewis.....	155	54	149	126	54	44	582
								Maxwell.....	70	47	124	148			

GASOLINE PASSENGER CARS

	Jan.	Feb.	Mar.	April	May	June	Total
Marquette.....	12	5	5	10	1	2	35
Mason.....	3	1	..	..	1	2	7
Monroe.....	1	4	27	48	48	34	162
Monarch.....	19	6	6	6	2	1	40
Marathon.....	6	3	5	5	2	..	21
Moline.....	5	..	4	9	3	2	23
Marion.....	14	3	9	14	3	2	45
Moon.....	5	2	3	4	2	..	16
McIntyre.....	..	..	3	1	..	..	4
Matheson.....	2	2	1	1	..	..	6
Mora.....	1	..	3	1	..	1	6
Midland.....	1	..	..	2	..	..	4
Marvel.....	1	..	..	..	..	1	3
McFarland.....	1	..	2	..	..	1	4
Marlette.....	..	..	1	..	..	..	1
Meteor.....	..	..	..	2	..	..	4
Motorcar.....	..	..	4	5	1	..	10
Mt. Pleasant.....	..	..	..	2	..	1	3
Middleby.....	..	..	..	1	..	..	1
Melbourne.....	..	..	..	..	1	..	1
National.....	15	5	7	6	4	3	40
Northern.....	5	3	6	13	8	11	46
Nyberg.....	..	..	6	4	4	2	16
Norwalk.....	1	..	..	..	..	..	1
Northway.....	1	..	..	..	..	..	1
Northwestern.....	..	1	..	..	..	..	1
Nicholds.....	..	1	..	1	..	..	2
Oldsmobile.....	328	69	161	148	90	..	876
Oakland.....	523	215	442	325	123	89	1717
Overland.....	1262	590	1852	1259	634	627	6224
Owen.....	5	4	3	1	3	..	16
Orient.....	..	2	..	..	..	..	2
Orion.....	..	1	..	..	..	..	1
Olympic.....	..	..	..	1	..	..	1
Ohio.....	..	..	..	..	3	..	3
Packard.....	410	22	45	47	35	15	574
Paterson.....	107	57	164	86	39	15	468
Peerless.....	60	8	16	14	4	8	110
Pierce-Arrow.....	95	4	13	10	9	7	138
Paige-Detroit.....	517	128	277	180	86	67	1255
Pope.....	41	5	19	20	15	9	109
Premier.....	7	1	4	4	1	1	18
Pullman.....	..	1	6	12	14	8	41
Partin-Palmer.....	..	..	6	4	1	..	6
Parry.....	..	2	6	4	1	..	13
Palmer-Singer.....	1	1	3	3	..	..	8
Peninsular.....	..	..	2	..	..	..	2
Perfection.....	..	..	1	..	..	..	1
Pastora.....	..	1	..	..	..	..	1
Pilgrim.....	..	1	..	..	..	..	1
Pioneer.....	..	1	..	..	1	2	4
Pratt-Elkhart.....	..	1	..	4	..	1	6
Pilot.....	2	1	..	..	..	..	3
Princess.....	1	..	..	1	..	2	4
Puritan.....	1	..	..	..	1	..	2
Pathfinder.....	..	..	..	1	..	..	1
Reo.....	1162	378	1183	872	386	249	4230
R.-C.-H.....	145	72	141	92	39	15	504
Regal.....	169	116	236	173	105	55	854
Rainier.....	4	2	6	2	1	1	16
Rider-Lewis.....	..	1	3	2	..	1	7
Ross.....	8	3	2	1	..	1	4
Read.....	..	..	..	1	..	..	12
Royal.....	2	..	1	2	1	1	7
Remington.....	..	1	..	..	..	..	1
Rambler.....	..	..	..	2	..	..	2
Rayfield.....	..	..	..	..	1	1	1
Studebaker.....	1206	562	1168	755	343	236	4270
Saxon.....	107	56	158	198	170	145	834
Stevens-Duryea.....	40	2	22	13	4	3	84
Stoddard.....	..	..	..	..	..	..	..
Dayton.....	56	19	32	24	14	15	160
Stutz.....	7	3	5	2	1	2	20
Stearns.....	5	..	2	10	1	2	20
Simplex.....	4	..	1	4	1	..	10
Scrapps-Booth.....	15	9	5	12	15	12	68
Schacht.....	5	4	7	4	4	3	27
Speedwell.....	4	5	3	6	3	3	24
Stanley.....	7	2	11	4	7	3	34
Suburban.....	7	1	3	..	..	..	11
Sears.....	..	..	13	14	6	2	35
Stewart.....	..	..	..	..	1	1	4
Sphinx.....	..	1	1	1	1	1	4
Selden.....	3	..	2	1	1	1	8
Springfield.....	..	..	..	1	..	..	1
Sultan.....	..	1	..	..	..	..	1
Staver.....	..	1	..	2	1	..	4
Thomas.....	28	2	15	14	14	7	80
Templeton.....	..	1	..	..	..	..	1
Triumph.....	..	..	..	..	..	1	1
Velie.....	10	5	6	13	2	7	43
Vulcan.....	..	2	4	2	2	1	11
Valey.....	7	..	1	..	..	..	8
Victor.....	..	..	..	1	..	..	1
Winton.....	154	26	62	38	19	29	328
Warren.....	163	53	81	51	33	20	401
Welch.....	31	3	19	14	5	4	76
White.....	41	6	18	28	12	5	110
Wayne.....	9	6	4	5	8	8	40
Westcott.....	13	3	7	3	3	1	30
Wahl.....	2	2	2	1	..	..	7
Wolverine.....	1	..	..	..	..	..	1
Whiting.....	..	..	..	..	1	..	1
Zimmerman.....	..	1	4	3	1	..	9
Miscellaneous.....	433	50	49	60	62	32	686
Total	25,342	9691	22,062	17,942	9420	7088	90,664

ELECTRIC PASSENGER CARS

	Jan.	Feb.	Mar.	April	May	June	Total
Argo.....	30	..	10	..	..	..	46
Baker.....	97	4	3	..	1	3	108
Broc.....	8	1	1	1	..	..	10
Babcock.....	8	1	..	2	..	..	11
Borland.....	..	1	..	1	..	..	2
Century.....	63	4	8	2	1	1	84
Colonial.....	..	1	..	..	..	..	1
Church-Field.....	27	3	1	..	1	1	33
Columbus Buggy.....	24	2	2	3	2	1	34
Detroit.....	521	34	28	16	14	5	618
Eagle.....	..	1	..	..	..	..	1
Fuller Buggy.....	1	2	12	8	..	..	23
Flanders.....	8	3	11	..	..	..	22
Grinnell.....	108	15	10	1	10	2	146
Hupp-Yeats.....	41	4	3	3	..	3	54
Milburn.....	..	..	1	2	..	1	4
Ohio.....	38	2	7	4	4	1	56
Phipps-Grinnell.....	4	..	..	..	..	1	5
Rauch & Lang.....	139	4	12	4	4	2	165
Rex.....	3	..	..	..	..	..	3
Standard.....	..	..	1	3	2	..	6
Storms.....	..	..	..	1	..	..	1
Walker.....	14	1	..	..	..	..	15
Woods.....	80	8	8	3	4	1	104
Total	1219	93	118	56	44	22	1552

COMMERCIAL GASOLINE VEHICLES

	Jan.	Feb.	Mar.	April	May	June	Total
Alden-Sampson.....	27	4	4	10	6	5	56
Autocar.....	6	4	8	13	7	4	42
Alco.....	1	..	1	..	..	1	3
Aetna.....	1	..	1	1	..	..	3
Atterbury.....	..	..	1	1	..	..	2
Admiral.....	..	..	1	1	..	..	2
Atlas.....	..	..	..	1	1	..	2
Avery.....	..	..	..	1	1	..	2
Beyster.....	..	2	3	4	1	..	10
Bowling Green.....	..	..	1	..	..	..	1
Boyd.....	..	..	..	1	..	..	1
Bale.....	..	..	..	..	..	3	3
Commerce.....	77	5	8	9	13	5	117
Chase.....	23	2	4	4	2	2	37
Cass.....	8	2	6	5	5	1	27
Commercial.....	3	..	..	..	1	1	5
Crown.....	..	..	..	1	..	1	2
Duplex.....	3	..	4	..	1	2	10
Durant-Dort.....	19	6	18	32	10	6	91
Denby.....	1	1	1	1	4	..	8
Detroit Motor.....	..	..	..	..	4	..	4
Dudley.....	1	..	..	..	..	..	1
Dart.....	..	..	1	..	..	..	1
Diamond T.....	1	..	..	..	1	1	3
Driggs-Seabury.....	1	..	..	..	..	..	1
Dowagiac.....	..	..	..	..	..	..	1
Decatur.....	..	1	..	2	..	..	3
Enterprise.....	..	..	..	1	..	..	1
Federal.....	177	8	15	9	9	10	228
Four-Wheel Drive.....	1	..	1	..	2	..	4
Falcon.....	..	..	..	..	1	..	1
G.M.C.....	194	6	25	17	11	6	259
Grabowsky.....	36	3	6	10	4	2	61
Grand Rapids.....	3	..	..	..	..	1	4
Gramm.....	11	1	2	1	..	..	15
Gaeth.....	1	..	1	..	..	..	2
Gaylord.....	..	..	..	12	4	..	16
Galloway.....	..	..	..	1	..	..	1
Horner.....	24	2	3	2	3	1	35
Hewitt.....	1	..	..	..	..	..	1
Huron.....	..	..	..	1	1	..	2
International Harvester.....	81	20	77	71	49	26	324
International.....	..	9	4	4	1	..	18
Johnson.....	..	..	..	1	..	1	2
Kelly-Springfield.....	20	20	5	2	1	3	60
Koehler.....	2	..	..	..	..	..	2
Kosmath.....	5	..	1	..	..	..	6
Krebs.....	..	..	1	..	..	..	1
Knox.....	4	1	..	..	..	..	5
Kalamazoo.....	..	..	2	7	5	4	18
Kiblinger.....	..	..	..	2	..	..	2
Little Giant.....	11	3	..	1	2	2	9
Lauth-Juergens.....	..	2	2	..	..	..	4
Lippard.....	2	..	..	..	..	..	2
Stewart.....	..	..	1	..	..	..	1
Logan.....	..	..	..	..	..	1	2
Mais.....	1	..	2	..	..	..	3

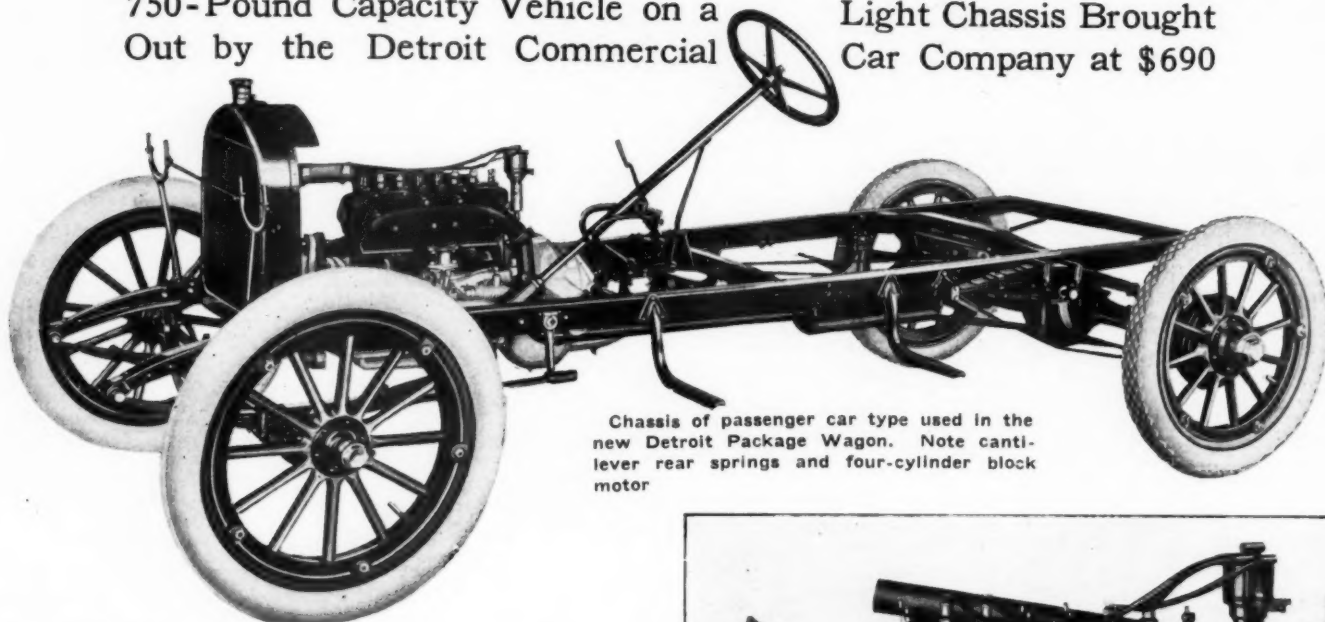
MANUFACTURERS' AND DEALERS' LICENSES

	Jan.	Feb.	Mar.	April	May	June	Total
Mogul.....	2	..	..	..	..	..	3
Menominee.....	..	1	..	2	..	..	3
Mack.....	..	2	..	..	1	..	3
Motor Wagon.....	..	1	..	..	..	1	2
Monitor.....	..	..	..	1	..	..	1
Mercury.....	..	..	..	..	1	..	1
Motor Vehicle.....	..	..	..	..	..	1	1
Oliver.....	6	2	1	3	1	1	14
O.K.....	..	..	..	1	1	..	2
Packard.....	94	4	9	3	5	5	120
Poss.....	16	4	2	2	3	..	27
Parcel Post.....	6	2	2	..	1	..	11
Pierce-Arrow.....	17	..	..	..	..	1	18
Peerless.....	20	..	2	2	2	..	26

Detroit Package Wagon Enters Field

750-Pound Capacity Vehicle on a
Out by the Detroit Commercial

Light Chassis Brought
Car Company at \$690



Chassis of passenger car type used in the new Detroit Package Wagon. Note cantilever rear springs and four-cylinder block motor

DETROIT'S automobile roster is to carry another name. The Detroit Commercial Car Co. has been formed with W. D. Paine, formerly a zone supervisor of the Maxwell Motor Co., as its president and general manager. The personnel of the company other than Mr. Paine has not been made public, but it is understood that sufficient capital is available for extensive manufacturing operations. Headquarters are being established at 1225 Woodward Avenue.

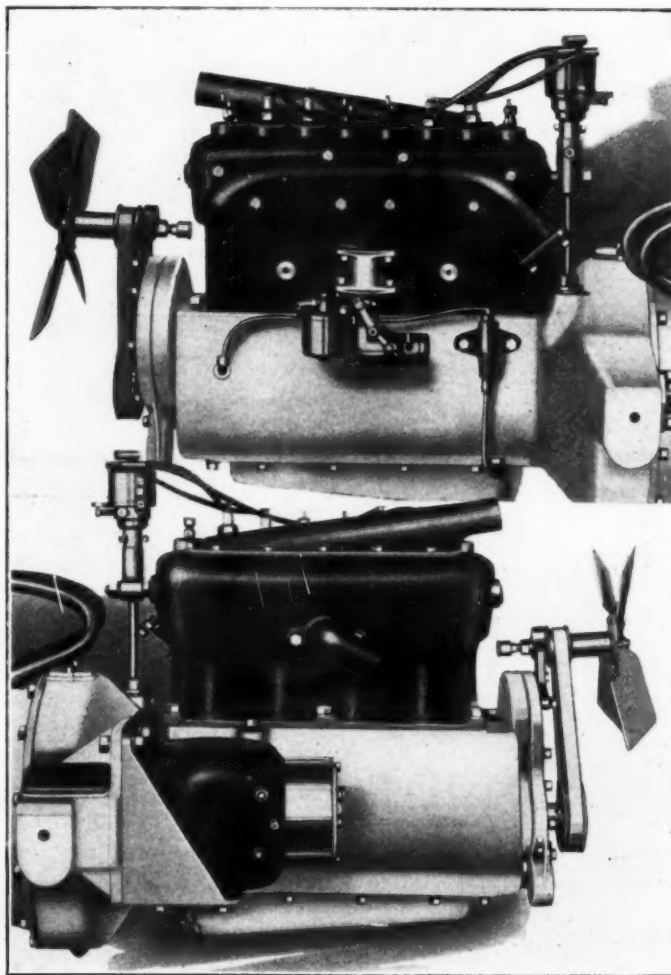
The product of the Detroit Commercial Car Co. is to be a light delivery vehicle, known as the Detroit Package Wagon, and having a rated capacity of 750 lb. Three types of light-delivery bodies are listed, one a standard panel body form of vehicle selling at \$690; another style having an open express body and also selling at \$690; and the third a full panel type of more elaborate body construction at \$745.

The chassis is practically the same as that used by a passenger car of similar size. This is quite a logical thing, because the load rating of 750 lb. along with the desirability of moderate speed in getting from place to place put the requirements of such a business vehicle very much in the same class as those of the average moderately light passenger automobile.

3¼ by 4 Block Motor

The chassis possesses a wheelbase of 106 inches and is powered with a four-cylinder block motor, 3¼ by 4. This develops 25 hp., it is claimed. The springing is rather out of the ordinary for a delivery car in that the rear suspension is by full cantilever springs. Tires are 30 by 3½ pneumatic. Also suggestive of the passenger type of vehicle is the floating rear axle which incorporates spiral-bevel gearing. Gearset and clutch, both in unit with the engine, are compactly designed. The clutch is a multiple disk type, and the gearset gives the conventional three speeds. The equipment at the prices above includes a single unit electric cranking and lighting system, which is a desirable feature in light delivery work, saving time of stopping and re-starting the engine, and also having an effect upon the fuel economy.

In detail, the engine offers nothing out of the standard beaten bath, being a compact unit. The cylinders are of

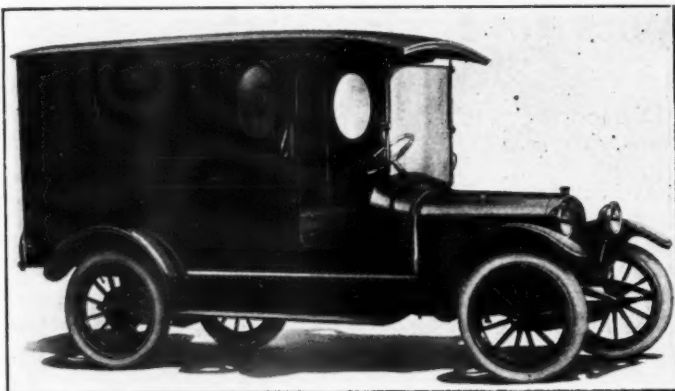
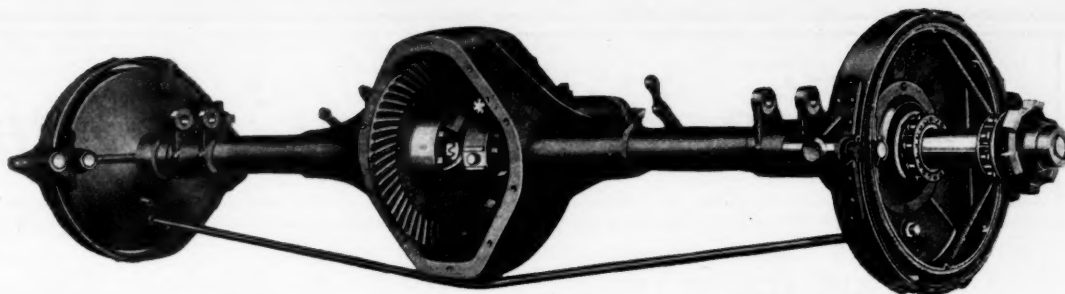


Above—Manifold side of the 3¼ by 4-in. four-cylinder block motor used in the Detroit Package Wagon showing mounting of carburetor and ignition distributor. Below—Right side of motor, showing motor generator

the L-head form with all valves on the left, cover plates enclosing the rods in good fashion. To promote lightness the crankcase, which is of barrel form, is of aluminum, being in unit with the housing of the flywheel. The cylinder block

Right—Floating type of rear axle used on Detroit Package Wagon, with cover plate removed showing spiral bevel driving gear. Brakes are 12-in. in diameter with a width of 2 in.

Below—Detroit Package Wagon with standard panel body selling for \$690



bolts to the case, and a bottom portion serves as the oil reservoir and cover for the bottom of the power plant as well. Its removal exposes all of the main bearings.

One-Piece Combined Manifold

Simplification of the intake and exhaust manifolding is brought about by the casting of both in one piece. The intake portion is below the exhaust part, and opening at the bottom center of the combination being for the carburetor attachment, while the exhaust-pipe connection is at the rear. This not only serves to clear up the valve side of the engine, but it has the advantage of bringing the incoming gases into intimate contact with the hot-exhaust piping, thus doing much in the interests of vaporization of the fuel.

Chrome-nickel steel is used for the camshaft and crankshaft alike. Each is carried on two bearings of good size, and numerous tests are said to have developed no weaknesses in these important parts. Standard construction is rigidly adhered to in the design of the valves, pistons, connecting-rods, and other internal parts, with lightness one of the aims. The idea has been to attain speeds which would put the engine in the so-called high-speed class. This ought to be most desirable for commercial car work, as the higher speed must necessarily have a beneficial influence on the gasoline economy.

The helical timing gears are neatly inclosed in aluminum housings at the front, while the drive for the motor-generator is provided for by a silent chain running in oil. This electric unit is carried on the right rear side of the crankcase on a specially-provided bracket. The end of the electric-unit housing is flanged to bolt directly to the crankcase support, thus making for good alignment of the parts concerned. Operating in the customary manner, the electric unit drives the crankshaft through its chain connection when doing its starting duty, and is in turn driven from the crankshaft when ordinarily running as a generator.

Connecticut Ignition System

Energy for ignition comes from the storage battery, its distribution being taken care of by a Connecticut coil and distributor mounted in a vertical position at the rear of the cylinder block and driven from the rear end of the camshaft by spiral gear connection.

Thermo-syphon cooling in conjunction with a honeycomb-

type radiator has been well adapted to the car, and splash lubrication has also been nicely laid out for the motor. These two items are very important for commercial work especially, for the cars get little rest, and must have substantial oiling arrangements along with adequate cooling facilities.

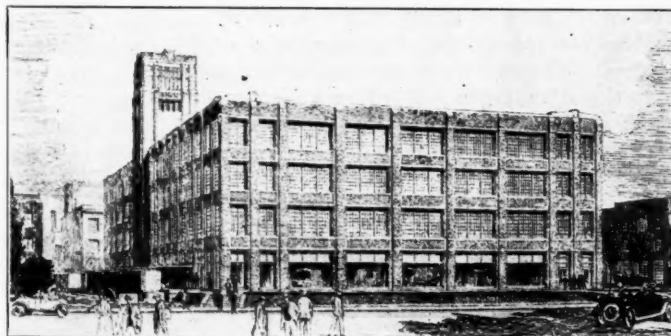
Smooth action of the clutch is also very important, and the maker states that the matter of gradual starting has not been neglected. Many times costly and fragile merchandise must be handled without jarring, and thus the clutch is called upon to be sweet of action. The clutch is therefore made to run in oil, with the plates held in engagement by one large main spring operating on four levers, the construction permitting the use of a comparatively light spring, and at the same time, owing to the large leverage obtained, providing a heavy gripping power.

Hotchkiss Drive

Drive is transmitted by a chrome-nickel steel shaft and two universals. The drive is taken on the Hotchkiss principle. That is, instead of having a torsion tube or a torsion rod alongside of the propeller shaft, the springs are used to push the car as well as to take the torque. This makes for a flexible chassis, and is doubtless well fitted for work in the light delivery-vehicle field, although somewhat unusual as compared with the average truck or delivery-car chassis.

Both differential and driving gears are of chrome-nickel steel, and the mechanism of the rear axle is all mounted on ball and roller bearings. At each side of the spiral bevel gearing there are both ball and roller bearings, the latter taking the thrust. At the wheel ends of the axle shafts they are carried by two roller bearings. Brakes should prove amply powerful for the vehicle with their width of 2-in. and 12-in. diameter.

Willys-Overland Building in St. Paul



The Willys-Overland Co. has started work on a new four-story and basement building in St. Paul, Minn., with a frontage of 461 ft. and a depth of 188 ft., 6 in. Part of the structure will be used as a service station and salesroom and the balance will be utilized for warehouse purposes. The structure will be of brick and steel and fireproof throughout. When completed it will contain 435,000 sq. ft. or approximately 10 acres of floor space, or about the area contained in four city blocks. St. Paul was chosen as a distributing point because of its location in the heart of a prosperous farm belt and being the largest railroad center in the Northwest. The records of the company show that 60 per cent of the Overland product goes to farmers, and Wisconsin, Minnesota and the Dakotas rank high in its sales reports.

▪ *The Engineers' Forum* ▪

Aluminum versus Steel in Motor Construction—J. E. Diamond Replies to F. R. Porter

By James E. Diamond

Engineer, Aluminum Castings Company

CLEVELAND, OHIO—Editor THE AUTOMOBILE:—Mr. Finley R. Porter's letter published in THE AUTOMOBILE of Sept. 2, equals in interest his contribution in the Aug. 12 issue. However, in several major particulars there still remains the same lack of coincidence in our respective views, though on one or two points we seem to be in a little closer agreement. Your contributor concedes that where rigidity is a main consideration, as in crank and transmission cases, aluminum is the proper material. This would leave undecided the question of the motor in which crankcase and motor block are cast integrally, the conclusions drawn by Mr. Porter being against the aluminum cylinder proper. As a matter of fact this design is rapidly gaining favor, and is a most desirable proposition from the aluminum standpoint.

Aluminum Piston Aids Efficiency

There seems to be as much of a difference of opinion concerning the aluminum alloy piston as before existed. I feel just as strongly that the aluminum piston will prove entirely successful in a high-duty motor as Mr. Porter does that it will not. Not only will the Lynite piston go hand in hand with this new type of motor, but it will be a factor in its greater successes. My conclusions are based as much on experience as anything else. Certainly some of the recent racing creations may truthfully be characterized as high-duty motors, and unless I am misinformed, practically all of the motors competing in recent speedway events have been equipped with aluminum alloy pistons, and that in addition, less piston trouble was experienced with those of this type than with the steel ones.

Mr. Porter minimizes the importance of the much greater thermal conductivity of the aluminum piston. My belief is that the advantages this offers may not be minimized. He bases his belief that this thermal property of the aluminum pistons has no real value due to the clearance between piston and cylinder, that is, that the piston is heat insulated. Unquestionably there is a retardation in the transference of heat, due to this condition, the heat having to pass through either an air space or an oil film, but in the final analysis is this the governing consideration? After all, is not the conduction of heat away from the piston head the main consideration?

The temperature generated by the explosion is conceivably momentarily intense, possibly exceeding even the melting point of iron, but in an exceedingly brief period of time this heat is being conducted to every portion of the piston. While this is taking place it is reasonable to suppose that the cylinder wall is abstracting a large quantity of this heat. In the distribution of the remainder of this heat throughout the entire piston, it will assume a higher mean temperature, and yet well within the safe temperature limit of the alloy.

That the cylinder walls will abstract a great deal of this

heat in the succeeding strokes, or until the next power one, may not be doubted. The fact that the carbon deposit on the head of aluminum pistons is much less than on iron ones would seem to show that the piston head is always cooler. Possibly the foregoing reasoning is false but it is the only one that seems to explain the results obtained in some recent experimental work. The case might be cited of a 5-in. Lynite piston being used in a high compression motor developing 170 hp. or thereabouts, well ripped, the transverse rib running nearly to the bottom of the skirt, with a skirt clearance of but 0.008 in. Without the ribs much greater clearances were necessary. In my opinion the significance of this is that these ribs conduct the heat away from the head, distributing it uniformly throughout the entire piston. Perhaps the additional radiating surface has something to do with it also. I am convinced that there is no weakening of the head of the Lynite piston, due to the exceedingly brief duration of the explosive temperature, and its immediate distribution. In any event, the head might be made three times thicker, and yet introduce no additional weight. Mass for mass the head of the light piston would compare very favorably in strength with the head of the steel piston advocated by Mr. Porter.

Unquestionably, the high-duty motor is the motor of the future, but as stated previously the Lynite piston is not going to be left behind. Regardless of the horsepower to be developed per cubic inch of displacement (0.5 hp. per cubic inch seems extraordinarily high), this type of piston will answer all requirements, and especially there need be no worry whatever about substituting this type for motors of the bores mentioned, namely 3 in. and it is self-evident that the steel pistons will always cost much more than the aluminum one.

Failures with Steel Pistons

I believe it quite proper to state that several engineers here have at one time or another looked longingly toward the steel piston, and where tried, that realization has fallen short of anticipation in many respects. One of these engineers has told me that he had found it necessary to allow much greater clearances than for aluminum alloy ones, the permissibly thinner sections used, and necessary with weight-saving an object, expanding exceedingly quicker, and the expansion no mean amount. This seemed to be the main source of trouble. Further when the steel piston seized it invariably damaged the cylinder, whereas the seizure of the aluminum alloy pistons very rarely did any damage. The question of clearances with the aluminum pistons has not proved to be the troublesome problem anticipated, and several methods of eliminating piston slaps have been developed.

Question of Tensile Strength

The writer purposely placed the figure for the tensile strength of aluminum low, merely for purposes of com-

parison. In stating that the average strength of the steel used in an all-steel job would be nearer 60,000 lb. than 120,000, which figure is arrived at by accepting as fact Mr. Porter's statement that the strength of aluminum is but one-sixth that of the modern steel, the steel casting was assumed to play a very important factor in the all-steel motor. Merely as a matter of general interest, my company is prepared to furnish Lynite alloys which have a tensile strength between 40,000 and 50,000 lb. per sq. in. I certainly appreciate the extraordinary strength of some of the recent steels after proper heat treatment. I assumed that steels with a strength ranging between 200,000 and 300,000 lb. would be used for the camshaft, crankshaft, wristpin, etc. Concerning cast iron, my opinion still is that the average tensile strength will not exceed 20,000 lb. and that if a strength of 38,000 lb. is being obtained the material must be a semi-steel and it is not fair to classify it as an iron.

Aluminum Motors on Stocks

Mr. Porter still seems to be doubtful as to the feasibility of the sleeve construction in the design of the all-aluminum motor. My personal opinion is that the matter has passed beyond the stages of academic discussion in view of the fact that one manufacturer of the highest grade cars already has

started fairly large production (nearly 1000 motors) and will, I believe, shortly announce an all-aluminum motor. Certainly an intense interest has recently been displayed in the possibilities of this material in motor construction. Certain other manufacturers have told the writer of their determination to build aluminum motors exclusively when conditions again become normal.

Were the writer given to prophecy he would say that the aluminum motor was going to play a mighty part in the future of the motor industry, though he hastens to agree with your contributor that an all-steel motor may be built that will occupy a position of superiority all its own—but at what cost? The Mercedes aeronautical motor can never become a production proposition, and can never be less than extravagantly costly, and the matter of cost is certainly a vital factor to-day.

My impression is the same as your contributor's that the goal is the elimination of useless expenditure for material and methods not consistent with the results obtained. The writer submits that if the desired results are attainable by the use of aluminum; and where this is the case, why use the all-steel job, the cost of which is infinitely higher than the aluminum?—JAMES E. DIAMOND, Engineer, Aluminum Castings Co.

Samson Electric System for Cars Under 25 Hp.

Starting and Ignition Switch Are Combined

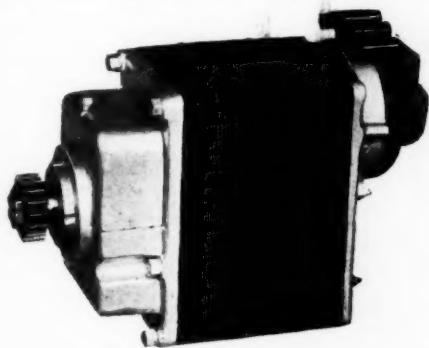
FOR small cars having motors developing not in excess of 25 hp., the Samson Engineering Co., Louisville, Ky., has brought out, under the name of type C, a complete electrical system for starting, lighting and ignition. The entire system comprises three units with the various accessories necessary for their operation. These units are a small motor generator with ignition apparatus built integrally with it, a 30-amp. hr. storage battery and a combination starting and ignition switch.

Inherent Regulation

The motor generator has inherent regulation, the winding being so arranged that below certain speeds it acts as a motor and above certain speeds, as a generator. It is connected to the crankshaft by a silent chain with 3 to 1 gear reduction and exerts 40 ft. lb. at the armature shaft. The motor generator is constantly engaged with the crankshaft and when the latter is running under its own power the motor generator acts as a dynamo furnishing current to the storage battery at a constant rate.

Easily Accessible

The ignition apparatus is a high-tension battery system having either automatic or hand advance. The interrupter mechanism is designed to eliminate lag and the breaker box and distributor are arranged to be accessible. The entire ignition outfit can be examined by the removal of a thumb screw which releases a small aluminum cap and exposes all the working parts. The system operates on the closed circuit principle and the

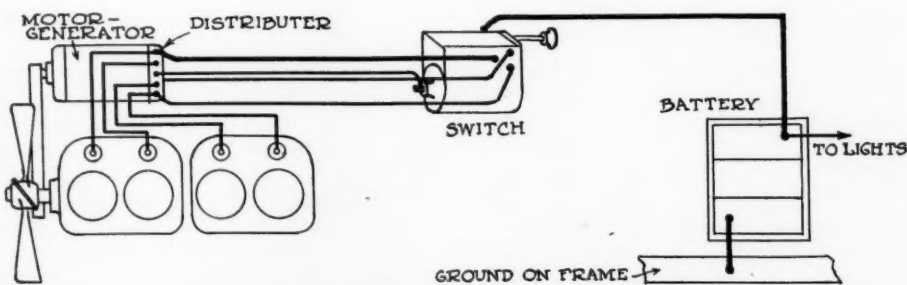


Samson type C starting, lighting and ignition system

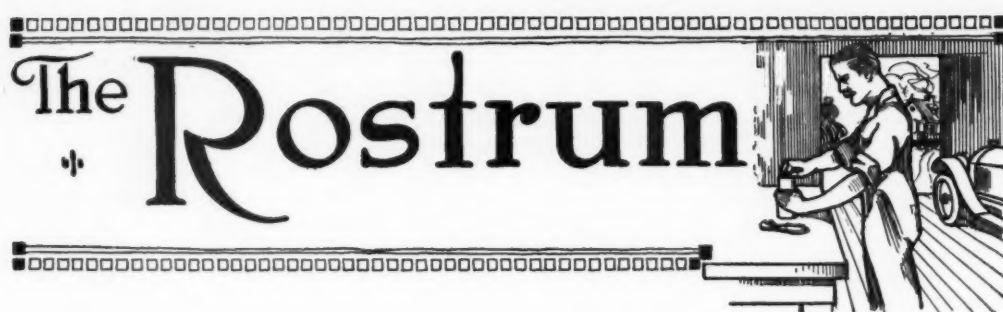
transformer coil is a part of the dash unit, thus giving a convenient mounting. For the ignition wires at the back of the dash unit there are suitable terminals and a housing to protect the connection. The starting and ignition switches operate together, thus giving an adaptation of the so-called non-stalling principle in which at low engine speeds, additional torque is furnished by the starting motor.

The operation is simple and is well

adapted for the lower priced cars. To start, the switch knob is pushed all the way in, which cranks the engine, and as soon as the latter is running under its own power, the knob is released connecting the battery for recharging. In stopping the car, the knob is pulled out until it is held which breaks the connection between the dynamo and the battery disconnects the ignition and when the key is removed, leaves it locked in this position. There are no automatic reverse current relays or cutouts, and everything has been done to keep the device simple and efficient and at the same time of low price. A special design is being made for Ford cars. The type C motor generator is 8 in. high, 5 in. wide and 13½ in. long, weighing 40 lb., and an arrangement has been made with the Columbia Machine Co. of Brooklyn, N. Y., whereby the latter concern will manufacture the Samson system. The headquarters of the Samson company, however, will remain at Louisville, and the marketing of the product will be handled from the Louisville office. The price has not as yet been fixed.



Wiring diagram of the new Samson type C electric system for cars under 25 hp.



Refers to Power Consumption in Motor Braking

EDITOR THE AUTOMOBILE:—Referring to your reply to A. W. P.'s inquiry of Fort Barry, Cal., in the Rostrum Department for Aug. 19, this seems to me to be such an important subject that I cannot refrain from giving my views on the tooth pressure question. I have always thought it the best practice to use the motor as a brake, thus saving the brakes as well as running less chance of accident through failure of the brakes. Many of my friends drive in the same way, and I have yet to hear of a stripped gear due to this practice.

Referring to your illustration of the train of gears: If when you turn a train of gears by the pinion you use a crank equal to the radius of the pinion, and when you turn the large gear, a crank equal to its radius, you will find the pressure required on the two cranks will be the same, and is exactly the pressure exerted on the teeth of the gears.

In other words, the tooth pressure on each gear of a pair must be approximately the same at any moment, because the teeth of the driven gear cannot receive more pressure than is transmitted by the teeth of the driving gear. This being true, the tooth pressure will be the same, when transmitting the same power, no matter which gear is driving.

As you state, the gears will transmit the same power whether starting or stopping in the same distance, provided we do not consider friction. But, when we consider that the friction of the rear axle and front wheels as well as the road friction must be overcome by the motor in starting, while this friction helps to bring the car to a stop, it will be seen that the power transmitted by the gears in stopping will be considerably less than in starting.

Los Angeles, Cal.

C. V. C.

Points on Tire and Tube Repair

EDITOR THE AUTOMOBILE:—It appears to me that you might publish some good points from time to time on repairs for tires and tubes. There are many minor repairs that the individual can do in his own garage, but he lacks the courage or proper knowledge of how to do the thing well. An interesting question is, what can a man do properly, and the manner of doing it, explaining any useful tools and their use? Should tubes be repaired by self-vulcanizing patches for minor troubles and limitations of same? Why are some more apt to blister, etc? Where a vulcanizer is used, should there be an outside or inside repair and what will be the dividing line between the two types. Note that very small outside repairs with heavy tubes are apt to mean a thin wall at point of puncture, and kindly give the best method for preventing same, etc., etc.

2—For shoes: means of repair and limits of ordinary equipment? Advisability of plastics, doughs, etc.? Treatment of blowouts by inside and outside patches, together with reliners, etc., and best types.

South Bethlehem, Pa.

W. P. J.

—Such a treatise was given in THE AUTOMOBILE for Sept. 18, 1913, and the subsequent issue. This covered in two

parts a complete course in what to do for tire repairs both on the roadside and garage. In this it was pointed out exactly how to repair different kinds of punctures, what tools to use, how to go about the work, and the necessary precautions to take to do a good, complete job. Shoes and vulcanizers are also carefully treated, and if you have a copy of this issue on file it will answer all the questions asked in your inquiry.

Bijur Electric System on Packard

EDITOR THE AUTOMOBILE:—Will you please explain the self-starting system used by the Packard cars, and the name of same?

2—Does a mechanical lubricator need any adjusting as to how much oil to feed is needed?

3—How can one tell whether the height of level in the splash system is correct?

N. Y. City.

L. K.

—For starting and lighting the Bijur constant voltage two-unit system is employed on the Packard. Ignition is by a timer with both automatic and hand advance; this is a special Delco product with one breaker cam operating two complete six-cylinder systems.

2—A mechanical lubricator generally has adjustments for each of the individual pumps which force the oil through the independent leads. The adjustment generally controls the length of the pump stroke, which in turn governs the amount of oil fed.

3—The oil level in a splash system can generally be determined by a riser gage mounted on one side of the crankcase. The level in the troughs is generally governed automatically, and if the oil is of sufficient depth in the pan to give a feed to the pump, the oil in the troughs will be correct. If the motor smokes it is sometimes an indication that the level is too high in the crankcase, but as a rule, the splash level is worked out in the factory and need not be touched by the driver.

Wants to Increase Motor Power

EDITOR THE AUTOMOBILE:—I have a 1913 Hupmobile 32 which I intend overhauling this fall, and in doing so would like to make a few changes. I would like to cut some weight off the reciprocating parts and I thought of boring some holes in the lower part of the piston and reducing some of the weight this way. Would you advise this?

If so, how close to the rings would I dare bore and what size holes and how close from center to center, the bore and stroke being $3\frac{1}{4}$ by $5\frac{1}{2}$? Would there be any other way in which I could reduce the weight without interfering with the strength of the parts? I notice also that on the timing marks on the flywheel, the valves do not open until the mark is about $\frac{1}{2}$ -in. past center and closes about $\frac{1}{2}$ -in. before the mark reaches center. I believe the cams are worn too much, thus affecting proper valve action. Am I correct in this, and if so, what would you recommend me to do to overcome this?

I would like to increase the power of this motor, also reduce the vibration at the higher speeds. Anything further which you may think of to suggest would be appreciated.

Lancaster, Pa.

E. W. K.

—Drilling holes through the pistons would not so much endanger the strength of the piston as it would the supply of oil to the rings. A number of these holes, if carelessly arranged, would act to starve the cylinders of lubrication with the result that the cylinders would rapidly wear. There would probably be no harm in drilling a few 1/4-in. holes scattered about the skirt of the piston, but the weight reduction gained in that way would amount to very little.

There is a possibility that the timing is incorrect due to cam wear, but you can readily determine this by checking up the timing with the following:

If the car is model K, inlet opens 11 deg. past top center, closes 43 deg. past bottom center. Exhaust opens 38 deg. before bottom center, closes 6 deg. after top center. If the car is model H, inlet opens 25 deg. past top center, closes 35 deg. past bottom center. Exhaust opens 40 deg. before bottom center, and closes 20 deg. past top center.

You could probably increase the power of this motor if you wanted to go to the expense by putting in a new camshaft with flat-faced racing cams and by having aluminum pistons, and tubular connecting-rods made. This would be quite an expense however, and it is doubtful if the gain would justify the expense. The ignition timing can also be advanced to give the earliest possible spark at extreme high speeds.

Some Automobile and Other Terms

Editor THE AUTOMOBILE:—What does Grand Prix mean?

2—What does Marathon mean when used in connection with races?

3—What is the meaning of garage? Does it mean a barn and is it a French word?

4—What speed should a racing car be capable of making with a four cylinder motor 37-8 by 5 1-2? The motor speed on the block is 3500 r.p.m., and the car weighs 1190 lb. and has 30 by 3 tires on wire wheels. The car is a special. The builder claims a maximum speed of 120 m.p.h. The present owner claims that at a recent test on a beach, the course straightaway, that a full mile was made in 34.09. This would be close to 103 m.p.h. Do you think it reasonable to expect from the foregoing description that the car would make that speed?

Center Village, N. Y.

M. J. C.

—Grand Prix are the French words signifying grand prize.

2—The word Marathon in connection with races signifies a contest held as a test of endurance and speed over a course on the open road, 26 miles, 385 yd. in length, or around a track in which the same distance must be covered, an imitation of a race run originally during the new Olympic games at Athens, Greece, in April, 1896. The name is derived from the legendary run of Pheidippides, who is supposed to have run to Athens after the Battle of Marathon, announced the victory and dropped dead in the market place. The distance the legendary runner covered is said to have been that given above. This name is never used in connection with automobile races except at the Montamarathon, where the name has been given as a pun on the Montamara Festival, which is held at the time of the race.

3—The meaning of the word garage is a building for the storage of automobiles. It is derived from the French word meaning the same.

4—It would be impossible from the data which you furnish to give any estimate of what the speed of the car can be as there are too many other factors which enter into the determination of speed.

Speedometer Shaft Should Be Tight

Editor THE AUTOMOBILE:—Following is a little experience which I have had and which may be of value to some of the readers of THE AUTOMOBILE. A year ago I had a speedometer which bothered me by the speed indicating dial not remaining steady but oscillating back and forth. I tried a number of different experiments and finally tightened the swivel joint on the end of the flexible shaft near the gear. I also strapped the shaft to the radius rod of the car, thus preventing it from swinging. This remedied the trouble. This year I have another speedometer and it gave me the same trouble which I remedied by tightening the swivel joint.

There are two cases which I know of where the garagemen have told the owners of the cars that the inside parts of their speedometers were worn out and would have to be renewed. Their trouble was finally remedied by simply preventing the flexible shaft from swinging.

W. Somerville, Mass.

J. H. M.

Ammeter Wanted on Cole 1915 4-40

Editor THE AUTOMOBILE:—I have a 1915 model 4-40 Cole car equipped with Delco electric system. I have recently purchased a Weston ammeter which I have connected to this system. While it works it only seems to record about half the amount that it should.

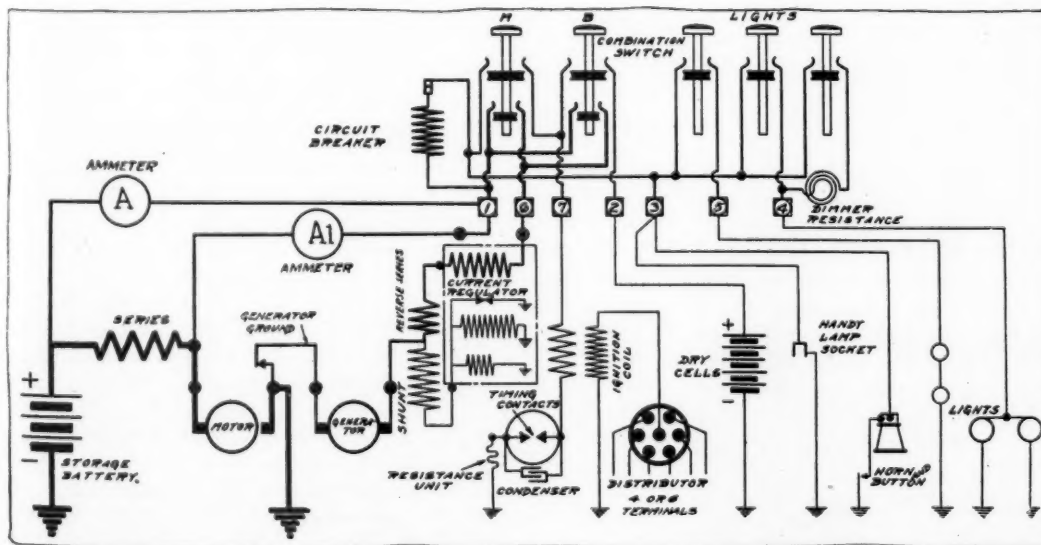


Fig. 1—Wiring diagram showing the installation of the ammeter on the Delco system. When connected at A1, the ammeter only shows a portion of the current. It should be connected at A

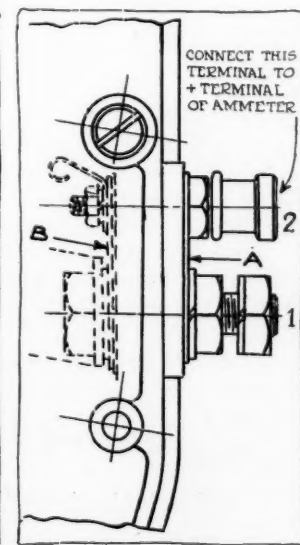


Fig. 2—Strap to be cut in connecting ammeter to Delco

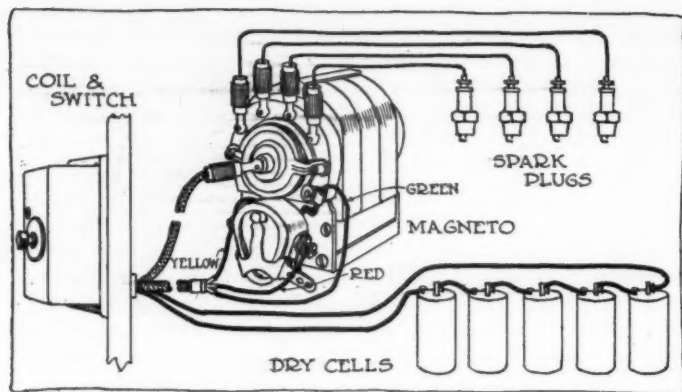


Fig. 3—Remy ignition for Regal model A 1909 cars

This ammeter is connected from the positive pole of the battery through the ammeter to the button marked M or to the circuit numbered 1, which is supposed to be in parallel with the charging circuit, as I understand it, and as I was so instructed to connect it by the Weston people.

It seems to me that by connecting it in the above manner I am only getting half the current through the ammeter, and any information which you can give me or a rough sketch of the manner of connecting this instrument will be greatly appreciated.

Paterson, N. J.

A. F. W.

By referring to Fig. 1, the ammeter should be installed in the circuit given as No. 1 between No. 1 post on the combination switch and the lines running to the storage battery, connecting the positive pole of the ammeter nearest the combination switch and the negative pole of the ammeter on the wire running to the storage battery, as the current runs from the combination switch to the battery. The highest charging rate on the generator on this model is 14 amperes or thereabouts, and the average is considerably lower than this.

From your letter it is not quite possible to tell how the ammeter is installed, but from what you say, it seems to be correct, although the generator does not charge as high as it should. Nevertheless, the charging rate is never higher than 14 amperes.

As you state this meter is connected in parallel with the charging circuit as shown by A' would indicate only a part of the charging current. This meter should be connected in the charging line as shown by A.

Connecting Ammeter on Hudson 6-40

Editor THE AUTOMOBILE:—Kindly advise me whether an ammeter can be put on a Hudson 1914 six-cylinder 40 hp. car.

Oil City, Pa.

H. J. F.

—To connect an ammeter on the 1914 6-40 model of the Hudson car proceed as follows: Remove three cap screws from top cover plate of motor generator housing and remove cover plate. This will expose the cutout relay; disconnect the black wire at the top right hand terminal of cutout relay and connect to positive ammeter wire; connect the negative wire of the ammeter to the cutout relay top right hand terminal where the black wire was disconnected; start the engine running and the ammeter will give the entire charging rate. Weston ammeter model 301 is generally used for this purpose and may be obtained from the Weston Electrical Instrument Co., of Newark, N. J., at a price of \$6.

Magneto Armature Windings Vary

Editor THE AUTOMOBILE:—What is the length, size and weight of wire used in the low-tension winding of a high-tension magneto of any standard make?

2—What is the length, size and weight of wire used in the high-tension winding?

3—What is the strength of the permanent magnets used on high-tension magnetos and how are they magnetized?

West Milford, W. Va.

P. W.

—The amount of wire used on the armature winding of the different high-tension magnetos varies with the different makes. A good example, however, of practice in this respect is that used on the armature of the Remy model P magneto where 1 lb. of number 18 Cotencamel wire is used. In the separate winding 8 1-2 lb. of secondary wire and 0.156 lb. of single primary wire are used.

2—This is answered under the previous paragraph.

3—The magnet of the Remy model P magneto will sustain about 3 lb. The magnets are magnetized by passing an electric current through a coil which surrounds the magnet in a charging apparatus.

Wants to Buy an S. A. E. Handbook

Editor THE AUTOMOBILE:—Kindly tell me how I could obtain an S. A. E. handbook, complete as described in the July 29 issue of THE AUTOMOBILE on page 210.

If possible to secure, could I do so free of charge, and if not, what would the cost be?

Dayton, O.

H. T.

—The S. A. E. Handbook can be obtained from the Society of Automobile Engineers, 29 West Thirty-ninth Street, New York City. It cannot be secured free of charge, but must be purchased from the Society, which will furnish you the price upon request.

Wiring Diagram for 1909 Regal

Editor THE AUTOMOBILE:—Kindly give me a diagram of the correct wiring of a Regal model A 1909 equipped with a Remy high-tension magneto.

2—In what turns do the cylinders fire?

3—Could you give me the commencing and closing serial numbers of the 1916 Fords?

Horton, N. Y.

H. B. C.

—The wiring diagram showing how the ignition is connected on the Remy system for the Regal 1909 model A is given in Fig. 3. According to the Regal company, the Remy low-tension system was used on this car and not the high-tension, and if the high-tension was put on, it must have been installed after the car left the factory.

2—The cylinders in the 1909 model A car fire in the order 1, 2, 4, 3.

3—The Ford fiscal year ended July 31, 1915, and August 1, 1915, was the beginning of the 1916 year. The first car built on August 1, 1915, had serial No. 856,516, and this is the first or opening number of the 1916 Fords.

Timing Valves by the Flywheel

Editor THE AUTOMOBILE:—Kindly explain in the columns of THE AUTOMOBILE how to time valves on the ordinary car by the flywheel in a simple manner for an amateur?

2—What is the best speed of a 1912 Winton six, in good condition?

Berkley, Va.

P. M. P.

—In general you will find the flywheel of a motor marked for the proper timing so that you will not have to do anything further than to see that the marks register with the indicator at the proper time. In case the flywheel is not marked, however, the method of procedure is as follows:

Bring the piston of No. 1 cylinder to upper dead center. On the frame of the motor, close to the flywheel, make a mark and then on the flywheel directly opposite this mark make another so that the two register when the piston of No. 1 cylinder is on upper dead center. If there is no portion of the engine frame sufficiently close to the flywheel for the

two marks to register it will be necessary to fasten to the engine some sort of an indicating mark such as a piece of sheet metal which extends close to the flywheel. The marks can then be made on this indicator. It is very often possible to slip a piece of sheet metal bent in a Z-shape between the two halves of the crank case with a hole so arranged that one of the bolts passes through the sheet of metal and holds it solidly.

With the piston of No. 1 cylinder on upper dead center, which can be determined by placing a stick of wood on the top of the piston and moving the crank upward until the stick is at its highest point or by some other means which will vary with the make of engine, the valves are allowed to both be closed resting against their seats. The intake valve is then arranged to open at anywhere between dead center and 10 deg. past. This is determined on the flywheel by passing a tape around the circumference starting with the mark for upper dead center of No. 1 cylinder and going entirely around and then laying off the length of the tape in 360 equal parts, each of which when laid around the flywheel will represent a degree. The timing gears are then meshed so that the intake starts to open a few degrees past top center. The exact number of degrees will be determined by the arrangement of the gear teeth, but it must be kept close to the top center. The time of closing of the intake will be determined by the cam and need not trouble you. When you have the mark on the flywheel for the point at which the intake starts to open for a No. 1 cylinder you should mark it I.O. No. 1. The point of exhaust opening is then determined in about the same manner, the opening of the exhaust starting between 35 and 40 deg. before lower center on the down stroke succeeding the intake stroke which, of course, is a down stroke. With the cams determined by the fact that the camshaft is in your possession, only the openings of the valves need be determined.

After you have marked on the flywheel E.O. No. 1, signifying the exhaust opens for No. 1 cylinder, you should go to the next cylinder which comes into operation, and mark the flywheel. After having determined the proper firing position for the No. 1 cylinder, the other cylinders will take care of themselves, since the camshaft and crankshaft have been designed to act in unison.

2—This car should be able to make 60 m.p.h. or better.

Width and Height of Two 1916 Cars

Editor THE AUTOMOBILE:—What is the entire width and height of the 1916 Overland and Maxwell cars? At what points are these the widest?

New York City.

C. G. S.

The width of the 1916 model 83 Overland is 67 in. and the widest point is across the rear fenders from tip to tip. The length with the top up is 148 1-2 in. and with the top down 161 1-2 in. The height of the car with the top up is 82 in.

The Maxwell touring car is 6 ft. 10½ in. high at the highest point, which is directly over the third bow of the touring car top when it is up. The widest point is from the outer end of the front hub caps at which point the width is 5 ft. 7 1-4 in.

Light Weight Cuts Fuel Consumption

Editor THE AUTOMOBILE:—How is it that the Franklin car obtains such a wonderful mileage on gasoline? What make of carbureter do they use?

2—What make of car is the Disbrow's Jay-Eye-See?

3—Did the Chalmers company ever try out a Weidely motor?

4—Why did the Premier company discontinue its use?

5—When in good running order, what speed should an Overland, model 60, 1912, car attain?

Somerville, Mass.

C. R. N.

—The reasons given by the Franklin company for their good mileage on gasoline are the following: 1—light weight; 2—air cooling, giving high thermal efficiency; 3—valve-in-head construction giving high thermal efficiency; 4—good mechanical efficiency for moving parts under load; 5—dash control of carbureter needle valve permitting mixture to be adjusted to suit varying conditions; 6—cord tires. The Franklin carbureter is used as shown in Fig. 4.

2—The Jay-Eye-See was made by the J. I. Case Threshing Machine Co., Racine, Wis.

3—The Chalmers company has never tried out the Weidely motor in their plant; nor made a full investigation of it.

4—The Premier company has not discontinued or abandoned the Weidely motor but, on the contrary, is building at the present time cars regularly equipped with this power plant.

5—According to the claims of the Willys-Overland Co., the Overland model 60 will develop 45 to 50 m.p.h. on good roads.

Valve Timing of Ford Opposed Motor

Editor THE AUTOMOBILE:—What is the correct valve timing, or as near as you can give it, of the old Ford double opposed motor? There is nothing which will tell me just when this motor was made.

White City, Kans.

L. W. G.

—There were three types of two-cylinder motors built by the Ford company known as Models A, C, and F, and the following information will advise you as to the way of determining which model the car is and also as to the valve timing of each of the three models.

The Model A has an 8-hp. motor with two cylinders with a stroke and bore of 4 in. each. The Model C, two-cylinder motor, 10 hp., with a stroke and bore of 4¼ in. each, and the Model F, two-cylinder motor, 12 hp., has a bore of 4½ in. and a stroke of 4 in.

In a Model A car the inlet valve opens 3¾ in. after center and closes at 3¼ in. before center. The exhaust opens 7¼ in. before center and closes on center. In the Model C the inlet valve opens 4 in. after center and closes at 3 3/16 in. after center; the exhaust valve opens at 6¼ in. before center and closes on center. The Model F inlet valve opens at 4½ in. after center and closes at 7½ in. after center, while the exhaust valve opens at 3 1/16 in. before center and closes on center. These measurements given above apply on the rim of the flywheel.

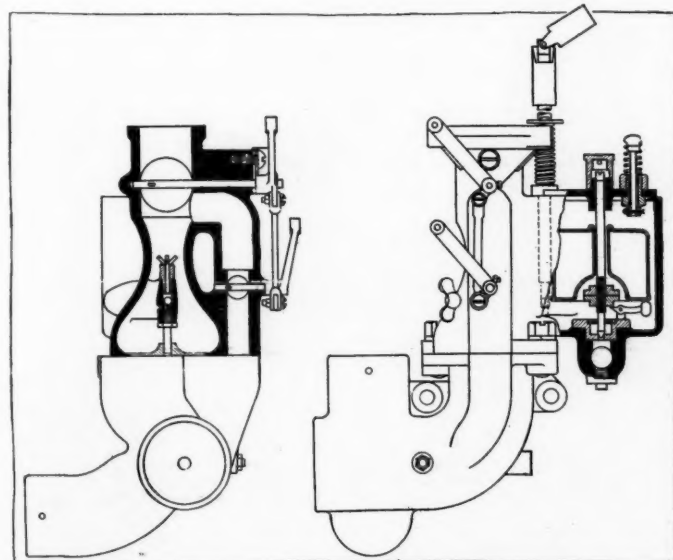


Fig. 4—Sectional views through the carbureter used on the Franklin car. This is a Franklin product, and according to that company is a factor in securing low fuel consumption

Ball Bearing Tests Involve Accurate Apparatus

Methods at S.K.F. Ball Bearing Factory Include Inspection of Material and Finished Balls with Latest Apparatus

By Arthur V. Farr

IN the new laboratory which has recently been completed in connection with the factory in Gothenburg, Sweden, of the S.K.F. Ball Bearing Co., a series of tests are installed for its ball bearings which are an example of up-to-dateness in the care and precision of bearing finish, and inspection. In no industry which involves the use of modern steels is it necessary to be more careful with the material. Fineness of structure is a necessity, and for this reason the steel is refined from the best Swedish ores in small charcoal furnaces and then melted in small crucibles with the alloying substances added to form the special S.K.F. steel.

Three Important Properties

After all the care has been taken in the selection of the initial materials and in the manufacturing processes, there are three important properties which a ball bearing must have. They are first, high fatigue limit; second, high resistance to

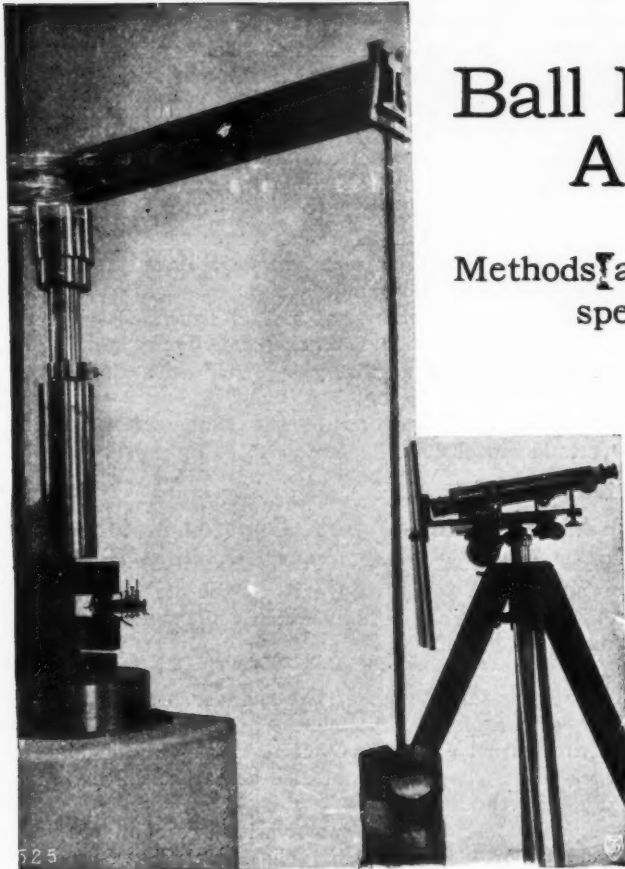


Fig. 1—Determining the elastic limit in the S. K. F. laboratory by Professor Stribeck's bending test

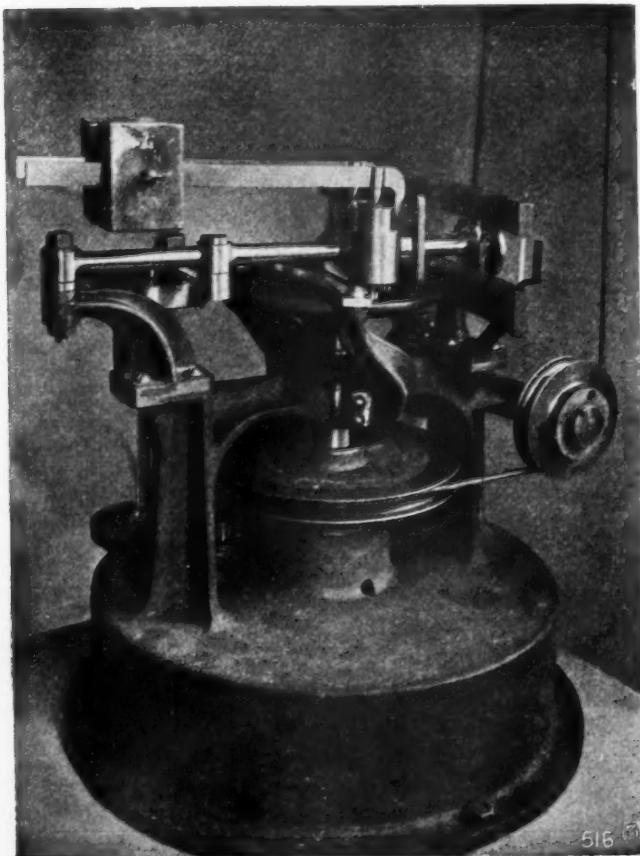


Fig. 2—Machine used in S. K. F. laboratory for wear tests by direct grinding

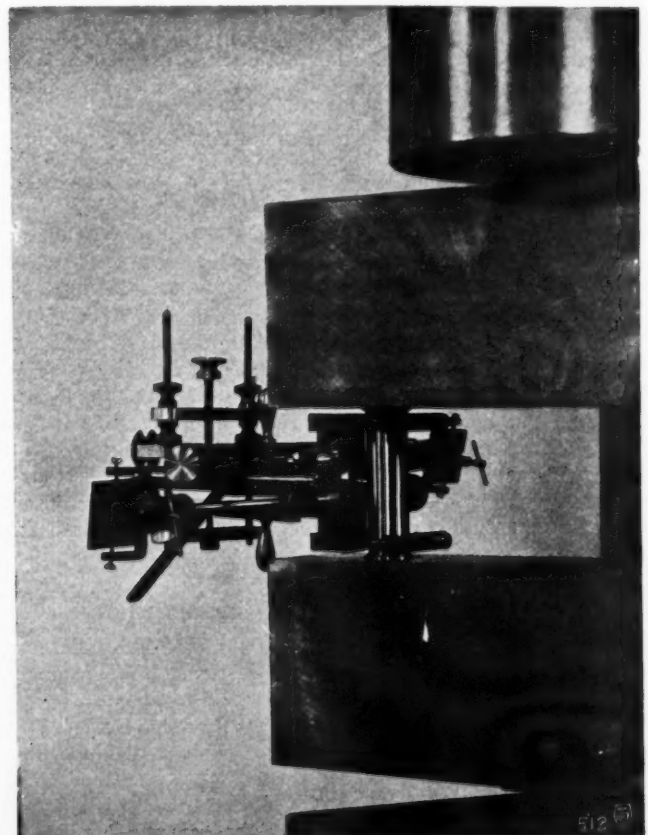


Fig. 3—For determining the elastic limit and modulus of elasticity, the above arrangement is used

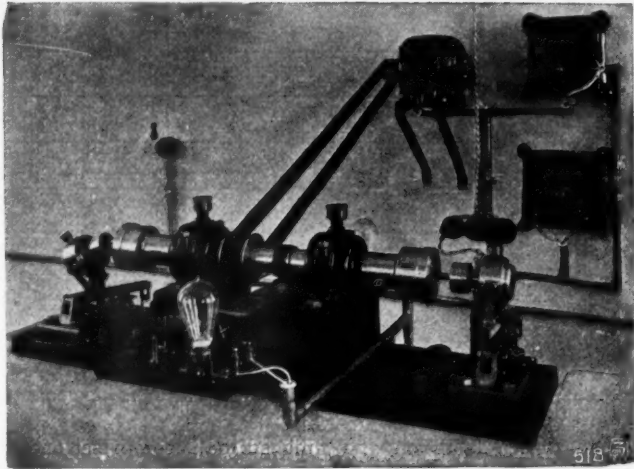


Fig. 4—The Woehler machine for testing the limit of fatigue by direct fatigue tests

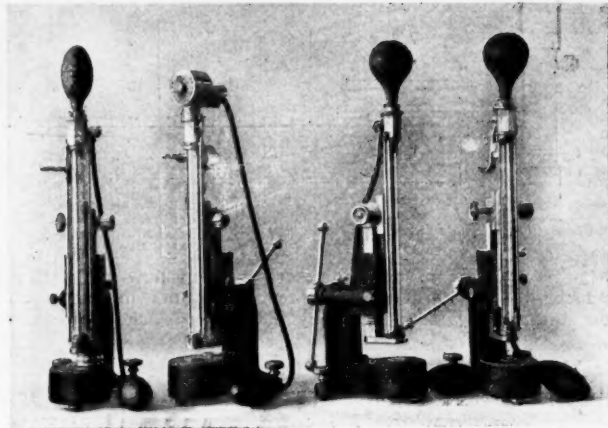


Fig. 6—Reboundmeter or scleroscope used for testing for hardness

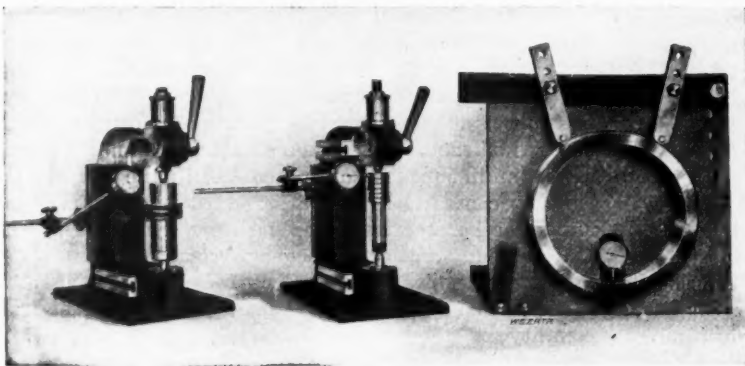


Fig. 5—Testing the finished balls for accuracy in a special appliance

Fig. 7—Center of right column—The Alpha machine. This machine is used in Brinnell's ball pressure test for hardness

blows and shocks, and third, highest resistance to wear. In other words, high tensile and compressive strengths and hardness with great elastic limit are the requirements.

Two Tests Are Necessary

There are two ways in which tests for these qualities can be carried out and both are necessary. First, by test pieces which have been treated exactly the same as the finished product, and second, tests on the actual finished balls. In the S. K. F. laboratory for the heat treatment of the test pieces there is an electric Heracus 300 to 1300 deg. C. adjustable furnace, and an American gas furnace for temperatures up to 1100 deg. C., which is a muffle design with the muffle inclosed by a fire-clay chamber approximately of the same shape as the muffle. The burners project into the combustion chamber from opposite sides and force the flame into the space surrounding the muffle. There is also an oil bath heated by gas for lower temperatures up to 300 deg. C. In these furnaces the measuring of the temperatures is accomplished by a Le Chatelier pyrometer which operates upon the principle of measurement of a current of electricity produced by heating a couple of two wires composed one of platinum, and the other platinum with 10 per cent rhodium. The current is measured by a galvanometer.

The Bending Tests

After the proper heat treatment has been accorded with the apparatus described, the work of determining the elastic limit and the breaking load, or fatigue limit, is done by making bending tests. The method consists of inserting a test piece in two parallel jaws which are loaded and operated as shown in Figs. 1, 3, and 8. In determining the elastic limit and the modulus of elasticity, the deflection for each successive load is carefully determined, as in Fig. 3, by transmitting the deflections to a steel pin which is pressed against the middle of the test bar by a spiral spring. The movements of the pin are measured by the aid of a Marten's mirror apparatus. The test is so carried out that as soon as a permanent set has taken place, the load has been noted.

For fatigue limit, direct fatigue tests are performed in accordance with

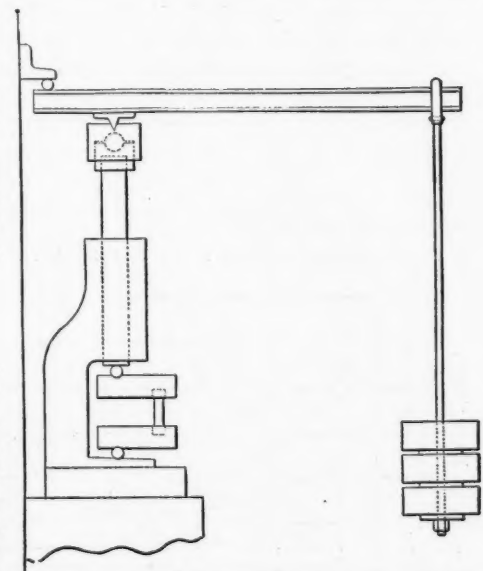
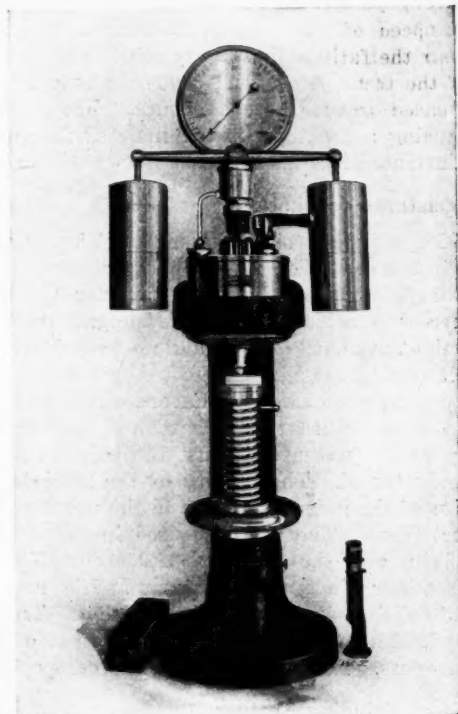


Fig. 8—Diagram of machine for bending tests, showing how the test piece is held in jaws and the system of levers

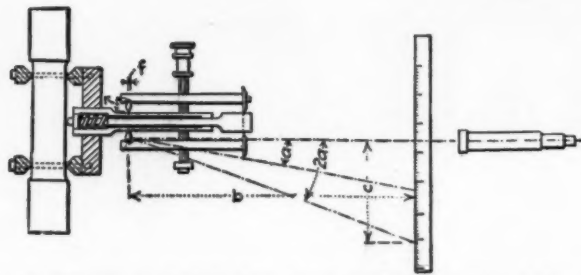


Fig. 9—Diagram of deflectometer, showing how the deflections, produced in the hardened steel test piece, are measured on the scale, the readings being made by the telescope, shown to the right

Woehler's method, which briefly consists of a shaft of steel rotating in two ball bearings and driven by a belt pulley from an electric motor, as shown in Fig. 4. The test piece is at each end of the shaft and is loaded at its outer end with a load resting with a ball bearing on the test piece. For each revolution a surface fiber of the material passes through a cycle of rest and maximum stress in each direction. A speed of 1400 r.p.m. is used with the starting load as near the fatigue limit as possible in order to shorten the time of the test. After each 2,000,000 revolutions, the load is increased until fracture ensues. The highest load, without causing a fracture, is the limit of fatigue. The method is illustrated in Fig. 10.

Resistance to Shock

Resistance to shock is measured by tenacity, and to ascertain the degree of this property, shock tests are made with a Charpy's hammer having a capacity of 72-ft. lb. This hammer gives a blow of measured impact by permitting a known weight attached as a pendulum to fall through a given number of degrees against the test piece.

Resistance to wear or hardness is tested for in the Brinnell machine. With this a hardened steel ball is forced under hydraulic pressure against the polished surface of the steel being tested. The quality of the material is judged by the size of the indentation due to the pressure of the ball on the test piece. The ball size used in the S. K. F. laboratory is 0.2 in. and the pressure 22,000 lb. For very hard steel, Professor Marten's scoring method is used. By this process the polished surface is scratched by a diamond under a fixed load. The width of the scratch gives a comparison of the hardness. Reboundimeter or scleroscope tests are also used.

Direct Grinding Testing

Fig. 2 shows the S. K. F. direct grinding wear testing machine on which two test pieces are fixed simultaneously to a moving arm which carries them backward and forward

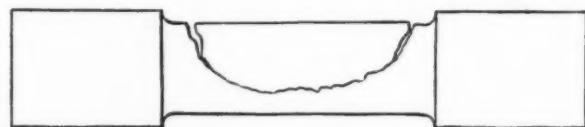


Fig. 11—Characteristic break of a hardened steel test piece

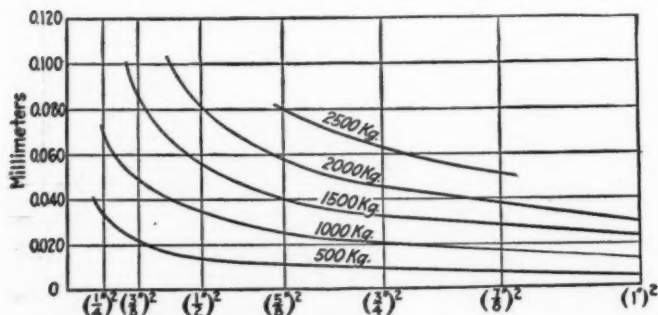


Fig. 12—Characteristic curves from ball tests

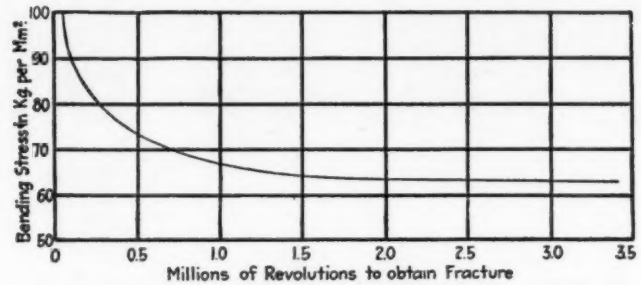


Fig. 10—Curve plotted to show the highest load reached without causing a fracture. This is the limit of fatigue

over a rotating disk. This method gives a combined comprehension of hardness and elasticity and is exceedingly accurate in its work.

The direct tests on the finished ball comprise one for elasticity by the Marten's mirror process as shown in Fig. 13, and one for hardness as shown in the illustration in which three balls are placed one upon the other. These are loaded and unloaded three times up to a certain given pressure, and after each series of loadings the center ball is taken out and the permanent set measured. If trials are performed with a number of balls of different diameters, the curves as shown in Fig. 12 are obtained by plotting the squares of the ball diameter as abscissae and the permanent set in millimeters as ordinates. With the curves it is possible by comparison with a standard set of curves to determine whether the balls are hard enough or not. This provides a ready and exact means of comparison.

In testing the finished races for accuracy, a special appliance such as shown in Fig. 5 is used to determine the equality of the thickness of the outer race. With this apparatus the race is slowly revolved on a mandrel, and the small errors are indicated on the dial of the instrument. For the inner race a similar method is used. In meeting the limit requirement, the measurements are made on combination gages which are designed to be accurate to within 0.000039 in.

Allowable Tolerances

The following tabulation gives the allowable limits:

For the bore—

Maximum + 0.005 mm. (0.0002 in.)

Minimum - 0.010 mm. (0.0004 in.)

For the outside diameter of small and medium brgs.

Maximum ± 0.000 mm. (0.0000 in.)

Minimum - 0.015 mm. (0.0006 in.)

For large brgs.

Maximum + 0.000 mm. (0.0000 in.)

Minimum ± 0.030 mm. (0.0012 in.)

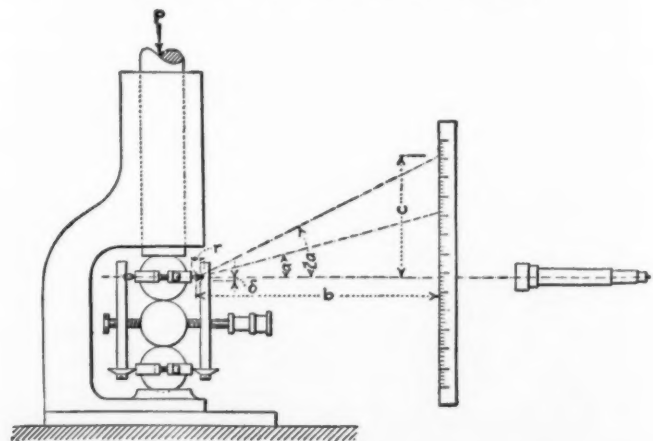


Fig. 13—Diagram of method of making direct test on balls. The elasticity is measured by the use of a Marten's mirror, the readings being noted by the use of the telescope

The Car That Stays Young

By M. C. K.

(Continued from Sept. 2, page 431)

ONE paragraph was devoted to fenders in the foregoing, the object being to present the most important considerations which have to do with their durability, especially their protection against disfigurement. Although fenders constitute one of the simplest features that could have been selected for beginning the sifting of data from which *The Car That Stays Young* may eventually be mentally evolved, it became plain at once that a whole little book could be written on fenders alone if it were desirable to mention every detail by which they may influence the style, durability and value of a car. Yet, fenders are not an organic element in automobile construction; a car can have the worst kind of fenders and be a good car in every other respect, and a sensible opinion of them can be formed without much previous study of automobile engineering. Though the nature and operation of the vehicle affect the durability of the fenders, they do not react upon the working parts of the power mechanism or the steering and therefore do not affect the operation. Perhaps for the reason that "there is nothing to understand" about features of this accessory nature, scarcely any attention has been given to explanations of their influence upon car values—not even in catalogs, where there would be room for complete monographs to help the public, as well as salesmen, to keep in mind the numerous little details which bear on car value but are easily overlooked.

Building an Opinion

In this place, where room must be made for all reasonable differences of opinion, each of the many subjects related to the fixed accessories or similar features can be followed only in its larger lines. The thing to be done, on this plan for quickly establishing a working basis for a final discussion, is thus to force one self to give definite expression in writing, for the purpose of ready reference, to the most important relations to durability and car value which seem associated with each of the simple construction features of an accessory character in automobiles, and to do the same, in so far as it seems practicable, with regard to working parts, exercising one's judgment during the progress of the compilation to limit the amount of material by excluding factors whose bearing upon durability and value is too difficult to determine, too indefinite or purely quantitative.

In each instance, after actual and tried forms of construction have been considered, there remains always the question if higher durability and value, as well as style, could not be attained by some method which has never been tried or which has been tried insufficiently or indifferently. In this respect the whole process for getting the subject under consideration should be of value for suggesting improvements, and these may subsequently, after being tried long enough, be turned into fresh data for a later type of *The Car That Stays Young*.

In the matter of fenders—to illustrate the method—the question of the gage and weight of the material was not referred to, as it is very hard to decide. Dents and bent corners are noticed in many very heavy fenders of city cars, and while thin fenders suffer more and more conspicuously they can also be more cheaply replaced. The matter of leather fenders stretched over a frame was also left unmentioned, as this type is being used less and less for automobiles. The use of cloth fabric and of thin boards was

passed by as an evident makeshift in point of style. Shaped sole leather fenders with unsupported edges were ignored because they have never been regularly manufactured and no means for making them hold their shape and giving them an attractive and waterproof finish has been developed.

There remained the following proposition of data, subject to proof, disproof or elaboration from the funds of superior experience or special knowledge on the subject:

Fender Requirements Restated

For cars of high price: Full-crowned fenders with rolled edges front and rear; secured to brackets in such manner as to leave outer edges as free as possible to yield a trifle. Material, sheet steel probably not more than 1/16 in. thick or aluminum alloy about twice as thick. Finish, paint or chemical coloration.

For cars of medium price: Crown-top fenders with reinforced edges. Material, sheet steel. Finish, paint.

For low-priced cars: Flat fenders of sheet steel, painted, with outer edges preferably flared at the most exposed portions in front and at the rear.

For all cars: Fenders should be so short and narrow as not to become buffers in all directions, even with some sacrifice of the protection against mud splashing. Front and rear ends (which are nearly always disfigured first) are either curved down to hug the wheels or reinforced with visor-like tips that are bent down sharply to catch the last of the splash, and the latter method seems to have the advantage in the matter of avoiding disfigurement and for style and light weight. Which of these conformations is preferable seems, however, to depend largely on the positions of the wheels; the down-curved fenders being most suitable for a wheelbase that is short in comparison with the over-all length of the vehicle and the short and tipped fenders for wheels that are placed far to the front and rear, respectively. The inference may be that wheels so placed provide a very considerable measure of protection for other portions of the car, by causing the pneumatic tires to act as bumpers much more frequently than where other portions project farther at the front and rear.

Since the protection obtained for fenders by making them narrow and short is due to the relatively greater projection of other portions of the car obtained by this means, it follows that additional protection can be obtained by making such parts as hub caps and running-boards unusually prominent and that the carrying of spare tires at the side or rear may be turned to account on the same principle. But little deliberate development of these provisions is seen in practice; fenders are usually more exposed than strictly necessary. The choice for the purchaser lies therefore at the present time, so far as fenders are concerned, among a number of more or less satisfactory compromises.

A Suggested Innovation

With regard to the future, one can imagine improvements of different sorts. The writer would be inclined to look hopefully upon experiments, for example, with sheet metal fenders having less than half the width that is now usual and arranged to receive an extension at the outer edge of much more pliable yet fairly stiff light material requiring no special finish, such as may be found among cellite or fiber compositions, or impregnated textiles. It might not be easy to make such a built-up fender compare well in style with a perfectly new full-crown or crown-top all-metal

fender, but much more difficult style-problems have been solved and the comparison with a more or less disfigured all-metal fender in its third or fourth year of service might be to the advantage of the innovation. In lightness and in the convenience and cheapness of replacement—which should affect only the extension edge—it could no doubt be made superior and in efficiency as a mud guard fully equal. Fenders with channel iron reinforcement of the edge already suggest a method for attaching a non-metallic extension in the form of a down-flaring rim, whose shape would be supported by the curvature of the line of attachment while its moderate width of four to six inches would lend it sufficient resilience to make it resume its original conformation and surface after an accidental impact. The strongest advance argument against a fender of this nature is perhaps that the extension edge would not be substantial enough for a person to lean against or to resist malicious meddlers, but the ordinary leather fender as well as the pneumatic tire and all fine and lustrous finish are more or less open to one or the other of these objections, and they are not found important in practice.

Radiators

Louis Renault many years ago presented to the world his solution of the problem relating to radiators for *The Car That Stays Young*. It is effective on the point of contributing to the preservation of the car's appearance, not only by taking the radiator out of harm's way but also by rendering the motor accessible, so that adjustments and repairs can be made with small chance of denting the motor hood. But the Renault method involves the technical principle of cooling the motor by means of a relatively larger quantity of very slowly circulating water, meaning considerable weight and incumbrance. With the height required of a thermo-syphon radiator to make it function acceptably for the average modern motor of 2000 r.p.m. or more, the only place for the radiator is between the motor and the dash, as selected by Renault in the first place, and by this disposition the feet and legs of the driver are heated uncomfortably unless the dash is double-walled and provided with heat insulation. These and other factors make it necessary to consider the standard radiator located at the front end of the vehicle frame and operated with forced circulation as the type to be kept in mind.

Widespread Desire for Strength

Assuming that a radiator of this type has been found capable of taking care of its thermal work when new and that the same may be said of a number of other radiators which are of the same general type but varying in details, the practical question is one relating to these details and to the provision made in each case for protecting the radiator against deteriorating influences. These are in the main torsion of the car frame, vibration, rust and external shocks and are all fully recognized in the practice of automobile building. Opinions differ only with regard to the price that should be paid for minimizing them and for reconciling any precautions that may be adopted with considerations of traditions and style. It is safe to say that, if *The Car That Stays Young* had been the ideal ordinarily guiding the public's choice of a car, robust construction and flexible mounting for pleasure car radiators would have come into fashion before truck makers had shown the way and certain standards would in that case have been developed by this time and would have been satisfactory even for cars which are driven roughly. Actually, however, the condition of a radiator after one year of use indicates mostly how the car has been treated and whether suitable shock absorbers have been fitted to the front springs or not. If the radiator remains as good as new in spite of rough car service there is apparently always question of a construction of much

higher first cost than could be contemplated for a popular car, and, if the past year has brought out any radiator equipment for a low-priced car of which something decidedly better can be said, testimony to that effect has not yet been made known broadly. For *The Car That Stays Young* a radiator that steams too easily is better than one which springs leaks from either rust or vibration or frame torsion, and it is also usually cheaper, having larger water channels, thicker metal and fewer joints, but it should of course be possible to combine mechanical strength with thermal efficacy and economical construction. A good part of the problem involved in this need lies, according to testimony of radiator engineers, in making the air current produced by the cooling fan or by the car motion strike all of the water channels instead of only a portion of their surface and reconciling this with moderate dimensions by having the air spaces as small as practicable. In the Solex type, used for trucks and omnibuses, these requirements seem to be met except in so far as the centrifugal fan in the middle of the radiator occupies a considerable space which could not be spared so well in the case of pleasure cars. On the whole the development tends toward the use of plain thin vertical or circular water tubes of copper or aluminum, a top reservoir of more than nominal capacity and a centrifugal water pump of rather small dimensions—a sort of compromise between thermo-syphon and forced circulation but with all the needed improvements in the matters of flexible mounting of the radiator and increased efficiency in the management of the cooling air current still awaiting the final word of approval.

External Protection

Only in the external means for protecting the radiator against impacts is there anything definite whose undoubted value for tending to keep the radiator from deteriorating may be weighed against simple considerations of price and style. The use of a tie rod between the two lamp brackets, the transverse buffer and a well advanced position of the front wheels operate together with the sheet metal apron now frequently placed between the frame horns to keep a honeycomb radiator intact in its somewhat frail ornateness, though they scarcely suffice to prevent the thin metallic cooling fins on tubular radiators from being mused or mashed.

Fastidious motorists complain that the use of all the four factors referred to—tie rod, buffer, apron and advanced wheels—which incidentally with their other purposes serve as outer defenses for the radiator, gives the front part of the vehicle a cluttered appearance, and hold that in point of style only the wheel position and the buffer are admissible. Coupled with the fact that the principal weakness of the radiator is internal and should be remedied first, this objection, which seems well taken if clean style is bound to prevail in the long run and to influence prices and values, points apparently to something entirely new which may give the radiator a more positive external protection than it now receives while also rendering possible the proper bracing of lamps and perhaps in some manner connecting with the installation of a motor starter. The whole situation seems complex with reference to *The Car That Stays Young* and suggests the need of a good deal of hard work on the part of designers.

Rusty Mufflers and Exhaust Pipes

Aluminum paint does not stay long on the muffler or the end of the exhaust pipe and they are usually freely abandoned to the inroads of corrosion, a running-board apron concealing the eyesore, and there the matter is dropped. Perhaps this matter is too small to dwell upon, yet it is noticed that sticklers for a clean style in vehicle lines are not enamored with running-board aprons or with the general plan of concealing unrepresentable details, so much less as these thereby usually become still more unrepresentable through

neglected accumulations of dirt. At least for high-priced cars it might be demanded that the muffler and the exhaust pipe should be made of aluminum rather than of sheet iron, especially as the high conductivity of aluminum would help to cool and contract the exhaust gases, reduce the noise and obviate muffler explosions.

The Fashion in Valances

More actual, and probably more important, at the present time is the question of the running-board apron, or valance, itself. It is fixed, semi-detachable or detachable and in some cases a small portion of it can be unbuttoned to make a gateway. Apparently its purpose is wholly one relating to appearances and the methods for grooming the vehicle. Whether it is desirable or not, when new, may therefore be considered a matter of taste, but experience must also be consulted when one is to decide whether it is always a good feature for The Car That Stays Young. It is unavoidably scuffed more or less, so that a high finish for it seems unlikely to last as long as that of the rest of the car body, and this is clearly against the high finish. In other instances, when the running-board is high and the car frame low, its appearance is less obtrusive and perhaps entirely acceptable, and again its place is taken by a piece of thick but pliable leather of rough finish which is buttoned or hooked to the board and the frame. The considerations which arise with reference to The Car That Stays Young are in all cases perfectly plain and elementary, once mentioned, but it would be interesting

to make sure of what the general opinion is with regard to the prospective permanence of the fixed valance as a style feature.

Motor Hoods

Sheet metal which has received an exceptionally smooth surface in the rolling mill is indispensable for taking a high finish which is also thin and therefore hard and lasting, but the difficulties formerly met in obtaining such material, and having it also sufficiently plastic, no longer exist, being reduced to a question of price. In the cheap car, paint is therefore as durable as enamel, for the hood. Some shapes take and hold a dent which under otherwise similar circumstances would be avoided with other shapes, but probably no other rule on this subject could be formulated except that sharp curvatures are most liable to be dented. Much more tangible are the simple questions relating to joints and hinges and to the fastenings of the hood on the frame. Where edges come together rainwater lodges and unless special precautions are taken streaks of rust are formed and spread to the sides under the finish. These precautions take so many different forms in well-built cars that no special mention of any of them is necessary and are withal so inexpensive that they might be found in every car. The fastenings at the base of the hood used to be troublesome and noisy but now nearly always include the necessary element of elasticity which prevents rattling permanently.

(To be continued)

Middle West Crops Presage Increased Car Sales

(Continued from page 499)

over the semi-arid plains of western Oklahoma and New Mexico as well.

A 20-cent raise in the price of oil has caused great activity in the Kansas and Oklahoma fields. The impression is abroad in the oil field that the Standard Oil Co., whose field company sets the price for the mid-continent district, is badly in need of crude for refined purposes. It is offering all kinds of inducements to operators who open up leases and the oil men are taking the statement of the Prairie Oil & Gas Co. that it wishes to open up production at its face value. Independent producers predicted a month ago that the "big raise" was due. It means nearly \$50,000 a day more money to Oklahoma producers alone.

The banks continue to hold immense deposits in the West and money is easy for all legitimate purposes, although the war makes many persons chary of starting in new enterprises.

Manganese in Missouri

Of interest to the automobile industry is a discovery reported by the mining bureaus in Springfield, Mo., in the Ozark Mountains. What is said to be the first manganese discovered in Missouri has been uncovered in Christian County. It is believed that there are other rich deposits in these mountains. Manganese is used in hardening steel and has been in great demand since the war began.

Jitney Business Settles Down

The jitney business in Kansas City, which looked bad for a time, has recovered somewhat and the 5-cent cars are doing a good business although there are not more than 100 small cars and twenty buses operating now, where three months ago the number of small cars was about 250 and the number of buses about forty. The failure of one line of buses—capitalized, as some said, on a "shoestring"—put a crimp in the business and kept new jitney men from entering the field.

The other buses put their prices up to 10 cents, but lack of patronage forced them down to the original "jitney" a few days later.

No More Failures

No more bus failures have been reported. The line which failed was operating fifteen buses and carrying a very heavy overhead expense, which seems to have been recognized in the jitney business as a sure "jitney breaker." Many jitney drivers who went into the game with rattle-trap cars or cars of high cost have dropped out, leaving the men who were equipped with cars more suitable for the traffic. Many of these say they are making good money and that they expect to continue in it.

Michigan's Six Months' Registrations

(Continued from page 504)

and delivery cars, and 111 are electric vehicles. Only thirty-nine foreign or European-made cars were found, all being gasoline passenger cars.

Registration Heaviest in January

The heaviest registration was recorded in January, the total for the month being 25,343. March was the second big month with a total of 22,262, and is followed by April with a total registration of 17,942. In February 9691 licenses were supplied, in May 9419, and in June only 6987. This is the record for the gasoline passenger cars only.

Commercial vehicles to the number of 1259 were registered the first month of the year, while for the succeeding five months the registration licenses issued were respectively 170,304, 362,248, and 156.

The biggest registration of electrics took place in January when 1219 were recorded. February shows a total of 93, March 118, April 56, May 44, and June only 22.

Bore Larger in Abbott-Detroit Eight



The new Abbott-Detroit eight-cylinder, seven-passenger touring car which sells at \$1,950

Increased from 3 to 3 1-4

In.—Piston

Displacement 332

Cu. In.—Individual

Front Seats—New

Folding

Type in Tonneau

THE 1916 Abbott-Detroit model, made by the Consolidated Car Co., Detroit, Mich., the successor of the old Abbott-Detroit Co., is a high-powered and gracefully designed machine offered at \$1,950. Equipped with an eight-cylinder engine, it follows a somewhat foreign body trend, with an accentuated slope to the hood and a consistently parallel slope to the body.

Bore Increased to 3 1/4

Chief among the changes, as compared with the model of 1915, is the increasing of the bore of the Herschell-Spillman V-type eight from 3 to 3 1/4 in., with the stroke remaining at 5 in. The motor is said to have a maximum horsepower of 80, this giving rise to the model designation of 8-80. The S. A. E. horsepower accorded it is 33.8, and the piston displacement is 332 cu. in. The car is said to be handled by the motor at from 1 to 70 miles an hour on high, and that it will do 40 miles an hour nicely on second speed.

Described on several occasions, this eight is not new to the public. It was used in the 1915 Abbott, and follows the same general lines as before with the increase in bore practically the only change of importance. The cylinder blocks, arranged at 90 deg. on the two-piece aluminum crankcase, are offset from one another the width of the connecting-rod and bearing so that the two rods of opposite cylinders attach side by side to the bearing, instead of using a yoke or a knuckle construction. This makes all the rod ends alike and interchangeable.

Separate Cam for Each Valve

Three main bearings support the crankshaft, and the camshaft, with sixteen integral cams, is also a three-bearing design. The offsetting of the two cylinder blocks makes possible the use of a separate cam for the operation of each valve instead of using one cam for two opposite valves.

Driven by spiral gear at the front is the pump shaft which operates the centrifugal water pump at the right front side of the engine. This is a double type of pump, effecting plenty of water circulation through the two blocks of cylinders. There are four water outlet connections to each of the water outlet manifolds, these being at the upper edge of the castings, thus taking the water off from the highest and hottest part of the cylinders.

Pressure Lubrication

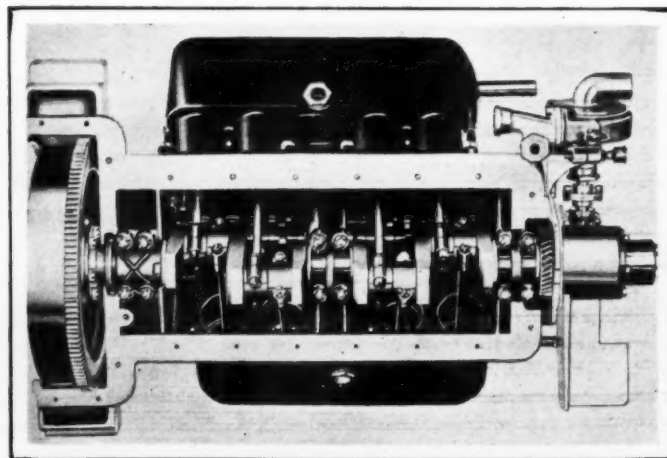
Pressure lubrication maintains a constant feed of oil on the main bearings, and it is regulated by a valve which dis-

charges the excess pressure of oil onto the spiral gears at the front.

Chassis differences over the model 8-44, the 1915 type, are few. The springs are longer by 1 in. than previously and somewhat straighter. This gives a better riding proposition, and there is less strain upon the springs. Mounted almost horizontally, and with less of a bow, the action is more nearly on both sides of the horizontal, and the springs are under less initial tension. This uniform action above and below the horizontal serves to make the spring strain more equal, with better results upon the metal. The springs are under-slung, permitting the joints to be hung low, and also aiding the riding qualities. The spring perches are swiveled on the axle.

Three-Speed Gearset

In the driving system, a three-speed gearset and multiple-disk clutch with ball throwout are employed. These units deliver their power through an ample propeller shaft to the floating rear axle. This is of the same design as heretofore, but instead of straight bevel gears, the later type of spiral bevels are fitted. In this construction, the teeth are given a curved form, and there is a rolling action of the teeth of pinion and gear. Silence is thereby promoted, and another point of the spiral-bevel is that the force is distributed over



Bottom view of Herschell-Spillman eight-cylinder motor used in the 1916 Abbott-Detroit

more tooth surface. Chrome-vanadium steel shafts have been adopted, along with chrome-nickel steel for the gears.

Individual Front Seats

The main features of the entirely new body design, in addition to the sloping lines already mentioned, are the use of individual front seats and the new type of concealed auxiliary seats. The front seats are entirely separate as in the commonly called phaeton models, and there is an aisle between them allowing access to the rear seat from the front.

A type of folding seat has been worked out which slides under the front seat and entirely out of view. A leather flap is provided on the back of the front seat, thus completely hiding the folding seat. They are also adjustable as to position, which is a commendable feature. In fact, the Consolidated concern thinks so much of these new auxiliary chairs that it has applied for patents upon them, it is said.

Enamelled leather upholstery has been applied, with the inner sides of the body trimmed with a vertical roll, and the tops of the doors with a double metallic Spanish roll, so called.

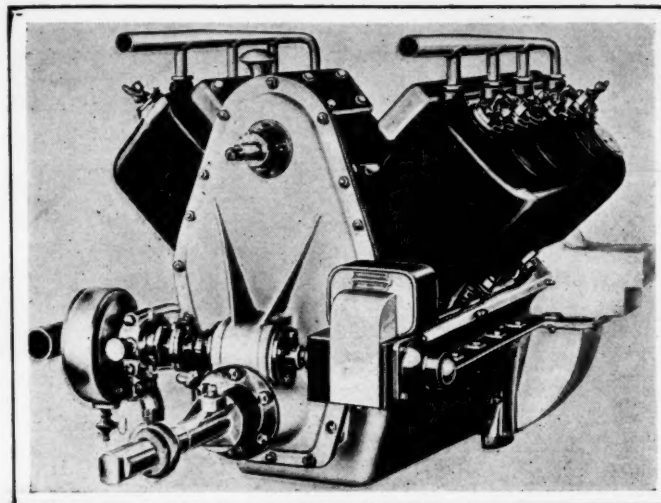
Windshield Slopes Backward

A feature which adds to the appearance is the mounting of the windshield. It is made to slope backward from the bottom to the top. There is said to be a special utilitarian value to this, as it makes it possible for the driver to see the road ahead when cars with glaring headlights are coming toward him. The idea is that the slanting shield glass reflects the rays of the approaching headlights downward so that they do not trouble the man at the wheel. It is also useful in eliminating back draft, insuring good ventilation, and acts as a storm-vision shield.

Fuel Tank at Rear

In the new car, the gasoline tank has been shifted from under the front seat to the back of the chassis, and the feed is by the Stewart vacuum tank system. Should the tank get out of order for any reason, there is a hand pressure pump provided which may be used to force gasoline to the carbureter. Special precaution against gasoline line troubles has been taken in the use of a rubber covering over the copper piping. This cushions jars, and has other obvious advantages.

A tilting steering wheel has been fitted, this not having so much use for getting into the drive seat, but being of special merit when it is desired to move about and turn around in getting from the front seat into the back of the car, through the aisle between the seats. The wheel hinges at the column and may be swung so as to be either above or below the post. A latch holds it in driving position. It controls a



The 3/4 by 5-in. eight-cylinder Herschell-Spillman motor used in the 1916 Abbott-Detroit

triple-pitch worm and full gear steering mechanism, and is on the left, the control levers being in the center.

In fitting a new type of top, a special feature has been incorporated, in that the entire back portion can be rolled up out of the way, making the top really a sunshade with free air circulation all around, when desired.

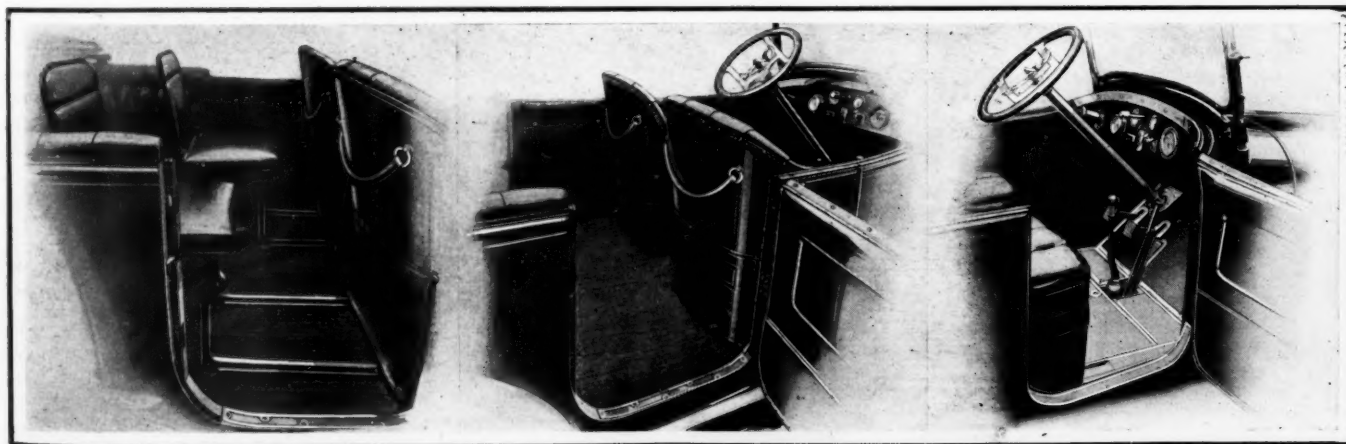
Equipment Is Complete

Equipment is unusually complete, some of the special items being a Boyce Motometer on the radiator cap, showing the temperature of the cooling water; power tire pump; trouble lamp; aisle-way lamp, and a master-key and lock system providing one key for the tire lock and other locks on the car.

The wheelbase is 121 in., and 35 by 4½-in. tires are used, the rear set being of the non-skid variety.

Armored Cars Cut Wire Entanglements

REPORTS from the front in the battle for the Dardanelles indicate that the armored automobiles are rendering valuable service, particularly in destroying wire entanglements erected before trenches or fortifications. The cars dart up to the wires, their armor protecting the crew from the fire of the enemy, grapple the wire with short hooks attached to chains and then make full speed to the rear, tearing away the wire so that a gap of over 150 yd. was open for a bayonet charge by the infantry.



Left—The new Abbott-Detroit folding auxiliary seats open. Center—How the tonneau entrance appears when the new auxiliary seats are folded away out of sight. Right—Driver's compartment of the eight-cylinder Abbott-Detroit showing control members

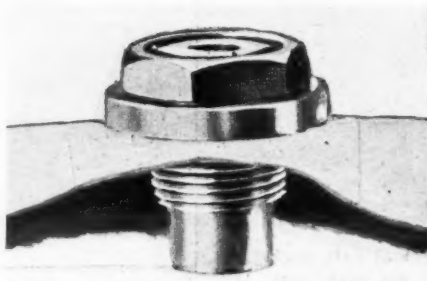
ACCESSORIES

McNutt Non-Explosive Cans

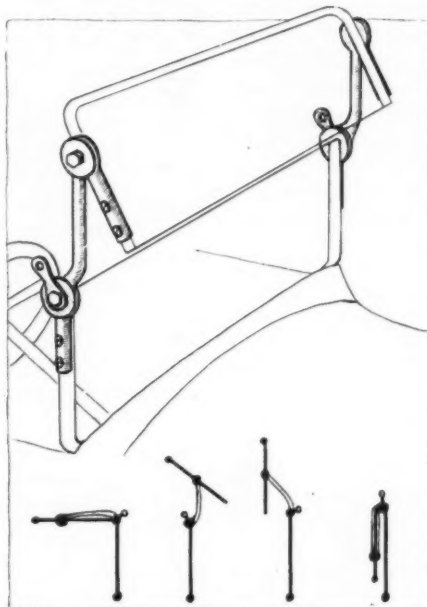
THE principle of all McNutt cans is to allow a gradual outlet for the expanding gas in case of great heat. In the safety bung, the plug closure garage can and the larger Eclipse can made by this concern, this pressure outlet is automatically protected by a fusible plug. When the internal pressure reaches 10 lb. or when the temperature rises to 400 deg. the valve in the plug is raised and allows the expanding gas to escape and burn instead of causing an explosion. Under extreme heat the fusible plug will melt, making the escape of expanding gas doubly certain. These cans can be thrown into the fire full of liquid, according to tests made by the manufacturer, without ever causing an explosion. The fusible plug prevents the explosion and the fire screen acts the same way as the screen in a miner's lamp, preventing the fire from starting. The price of the tank safety bung which generally fits motor boat tanks and small cars, such as the Ford, is \$4.50. The plug closure can of 5 gal. capacity is \$5. The large Eclipse can of 5 gal. capacity is \$6.—John C. Eames, Inc., New York City.

Jenney Shock Absorber

An oil pressure shock absorber for Ford cars has been brought out, in which the rebound of the springs is checked through a liquid absorbing medium. The shock absorbing medium is fastened to the springs in such a way that when the springs are depressed a plunger is forced through an oil cylinder, compressing a spring contained therein. Thus the spring acts in one direction and the oil pressure in the cylinder in the other. The spring, which is inclosed in the steel tube, is compressed by a downward



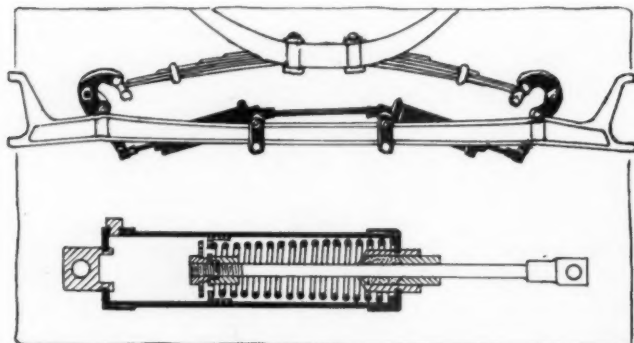
Fusible plug used in McNutt non-explosive cans and similar products



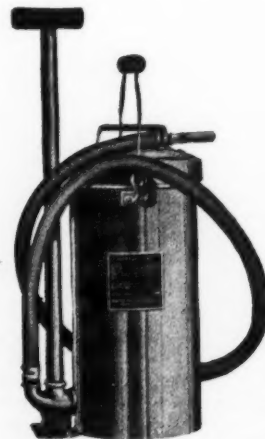
Illinois windshield hinge for Ford cars with diagrams of various positions



Smith rubber handled insulating screwdriver



Above—Jenney oil pressure shock absorber for Ford cars, showing mounting and construction. Right—Runyen grease cabinet with air pump



pressure on the main leaf by means of linkage connected at the spring shackles. The tube is filled with oil, and as the piston is filled with a series of holes, the oil passes through these freely while the spring is being compressed on its outward stroke, but as soon as the plunger starts back on the return stroke, due to the rebound of the spring, a washer presses against the piston, closing the holes, thus compelling the oil to be squeezed between the piston and the tube. This space is so small that considerable pressure is created, causing the return stroke to be retarded, thereby preventing the tossing action generally found on front spring rebound. A stuffing box prevents the oil from leaking past the piston rod. The manufacturers claim that a full set can be attached to a Ford car in about 2 hr. No holes need be drilled nor any parts altered. The price of the absorber is \$20 for a complete set of four.—Jenney Shock Absorber Co., Indianapolis, Ind.

Illinois Windshield Hinge

To transform the windshield of the Ford 1915 model to a rain-vision, ventilating type, this device has been brought out, and fits directly on the 1915 Ford with the cowl dash. All that is necessary to do is to take off the hinges as applied by the factory, which are on the windshield, open the Illinois windshield so that the hinge is at an angle of about 35 deg. to make it convenient for attaching, and then place the hinges on, the lower half first, afterward applying to the upper half. The same tapped holes and screws which are on the car may be used. The price is \$5.—Illinois Brass Mfg. Co., Chicago, Ill.

Runyen Grease Container

The Runyen grease container works on much the same principle as the ordinary hand grease gun, only is much larger and uses air pressure delivered by a pump to force the grease or oil through a long hose and nozzle direct to the desired point.

The illustration shows the device with the hose and nozzle in place. This apparatus is also self-measuring, for with each stroke of the handle it delivers $\frac{1}{4}$ lb. of grease or oil into the differential, timing gears, universals or gearset, and hence by counting the number of strokes or part strokes it is very easy to know exactly how much of the lubricant is being supplied.

There is obviously a saving of time with a device of this kind, for it takes much less time than hand application would. There is also no handling of the grease, and consequently any waste through handling is obviated. Then, too, such grease or oil ought to be cleaner when it reaches the part than it might be under hand operating circumstances.

The Runyen cabinet comes in three sizes. These are No. 1, which is of 7.5-lb. capacity, and which sells at \$6; No. 2 of 15-lb. capacity, and costing \$7; and No. 3, which can hold 23 lb., and is offered at \$8.—Runyen Mfg. Co., Grand Rapids, Mich.

Hero Safety Fender

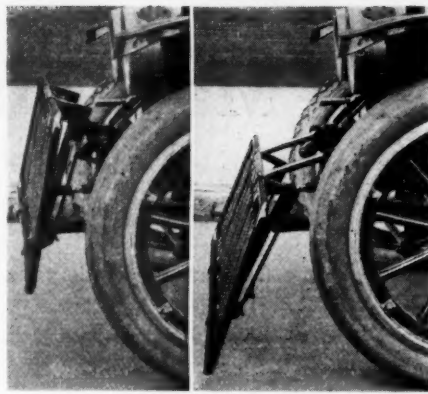
The Hero safety fender is a device adaptable to any car or truck which places under the control of the driver a safeguard against running over pedestrians, animals, etc., which may happen to stray in the path of the vehicle. The device is folded out of the way when not needed, but when an emergency arises a pressure on the brake pedal releases it and the protection against accidents is automatic. The device, which is under the driver's control, is quick-acting, and in city traffic and on the country road is out of the way.—The Hero Mfg. Co., Philadelphia, Pa.

Taylor Tire Pump

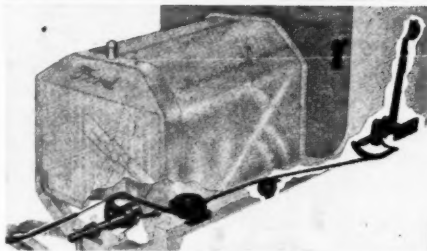
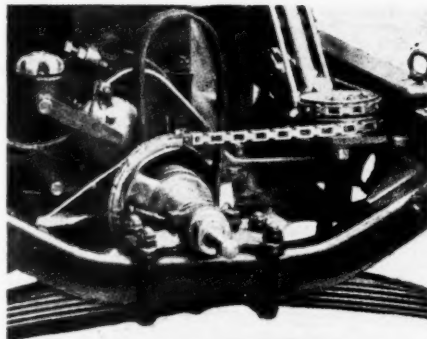
The Taylor is a diaphragm pump, there being no communication between the crankcase and the compression chamber so that oil cannot get to the tires. The pump is mounted on the end of the crankshaft when in use, and carried in the tool box or other convenient place at other times. Has no gears or brackets. Made for Hudson, Overland, Reo, Chandler, Studebaker, Stearns-Knight, Dodge and Chalmers cars. Price \$12.50 each.—Taylor Mfg. Co., Detroit, Mich.

Giant Ford Starter

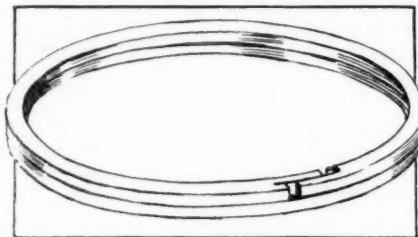
The Giant starter is a mechanical instrument intended especially for Ford cars. It is mounted on the forward end of the crankshaft and is entirely under the hood, with the exception of a pedal which is fastened to the dash except when in use. The operation of starting consists of releasing the pedal, allowing it to rise upright in a convenient position, and it is then pressed forward with the foot, rotating the crankshaft and starting the motor. The pedal is geared in



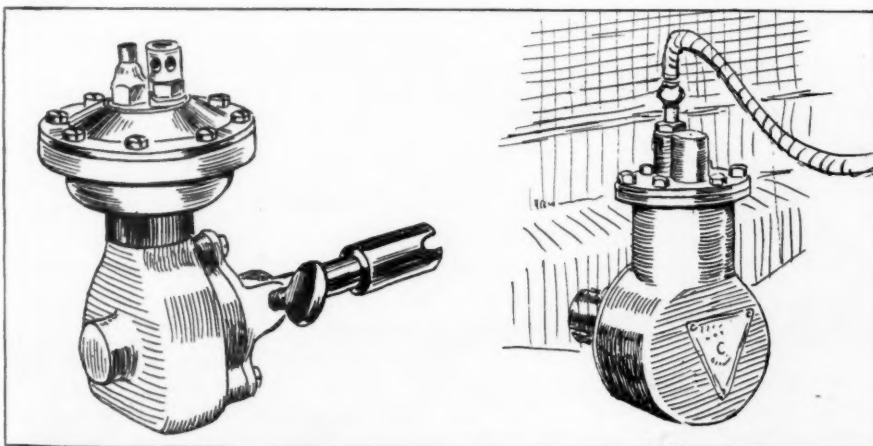
Two positions of the Hero safety fender



Detail and mounting of Giant starter for Fords



B-W piston ring, showing joints



Left—Taylor diaphragm pump. Right—Detroit piston pump. Both are driven from the front end of the crankshaft and are stowed away in the car when not in use

such a way that one stroke gives a half turn to the motor.

The starter is so arranged that should the motor backfire at any time, the pedal is held by a spring and the starter itself automatically releases. The working parts are all of nickel steel, and the chain used is motorcycle link, which is heavily designed to avoid breakage and stretching. It is stated that the starter can be attached in about 2 hr., as no boring need be done, the starter bolting directly to the motor and car frame as they are. In ordering it is necessary to specify whether the Ford is 1914 or 1915. The entire outfit, f.o.b. factory, sells for \$25.—Standard Starter & Specialty Co., Cleveland, Ohio.

Smith Insulating Screwdriver

An insulating covering of rubber is moulded over the handle and part of the blade of the Smith screwdriver which is 11 1/4 in. long over all and has a 6-in. blade; the rubber provides insulation against shocks which are likely to occur when work is done on any machinery or apparatus where current is flowing at high tension—especially ignition systems. The covering meets the blade flush so that there is no shoulder; the tool is smooth from end to end. Width of blade, 3/8 in. Price \$9 per dozen.—H. D. Smith & Co., Plantsville, Conn.

Detroit Power Tire Pump

The Detroit is a power tire pump of the type mounted at the forward end of the crankshaft where the crank is usually applied, and may be dismantled and stowed away in the toolbox or other part of the car when not in use. It drives directly without the use of gears and weighs 4 1/2 lb. It is adapted to Chandler, Dodge, Overland, Hudson, Reo, and Studebaker cars. Price, \$7.75.—Detroit Motor Accessories Co., Detroit, Mich.

B-W Piston Ring

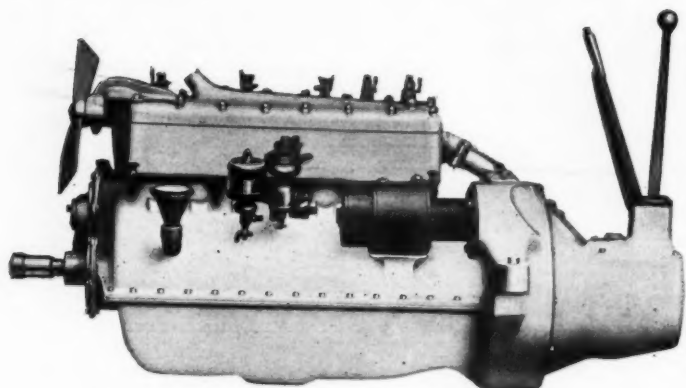
In this piston ring two eccentric rings are pinned so that their joints are opposite, the thick section of one ring being over the joint in the other. Leakage at the joints is prevented by the scarfing of the ends. The material is soft so that it will not wear the cylinders, yet it is said to possess considerable resiliency. The rings are tool finished and the surface is not ground.—Ballman-Whitten Mfg. Co., St. Louis, Mo.

Cyclone Carbon Remover

Cyclone is the name of a carbon remover in liquid form which, when sprayed into the motor while the cylinders are warm, though not hot, is said to loosen the deposits so that they are easily blown out through the exhaust when the motor is started. A pint is sufficient for four or five cleanings. The liquid is harmless.

Price, \$1 per pint.—Cyclone Co., Greenwich, Conn.

Three Bodies on Madison Six Chassis



Left side of 3 by 5 Rutenber motor used in Madison six

A NNOUNCEMENTS of the Madison six-cylinder cars show the line of the Madison Motors Co., Anderson, Ind., to include a roadster and a touring car at \$985 and a seven-passenger car at \$1,085. These bodies are all on a single chassis model which is fitted with a Rutenber unit power plant with 3 by 5 L-head cylinders. The catalog rating of the Rutenber motor is 40 hp. It has a three-bearing crankshaft of six throws drop forged from 0.35 to 0.45 carbon steel heat treated to give an elastic limit of at least 70,000 lb. per square inch. The elongation is 20 per cent in $2\frac{1}{2}$ in. and the reduction of area 50 per cent. The maximum stress put on the shaft section is 20,000 lb. per square inch. The bearings and pins are accurate to within 0.001 in. limit. Each shaft is balanced on the Norton machine.

Oil Relief Groove in Piston

The piston pin bearing is phosphor bronze. It is carried in the upper end of the connecting-rod with the pin fastened with a set screw directly into the piston. The pistons have three rings with an oil relief groove directly under the lower ring. This eliminates any possibility of an over-supply of oil in the combustion space. The motor has for additional features detachable head, and nickel steel valves of 1 5/16 in. diameter and 5/16 in. lift.

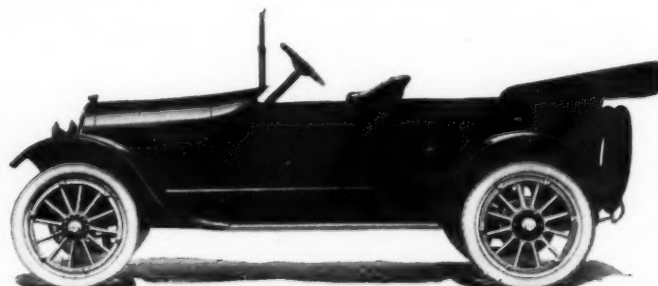
The timing gears have helical teeth and the valve lifters

are of the mushroom type both of which features tend to quiet the valve operation. Lubrication is provided by a constant splash and a vane pump feed direct to the bearings. Cooling is taken care of by a centrifugal pump and full cellular radiator of the modified V-shape with a German silver crown.

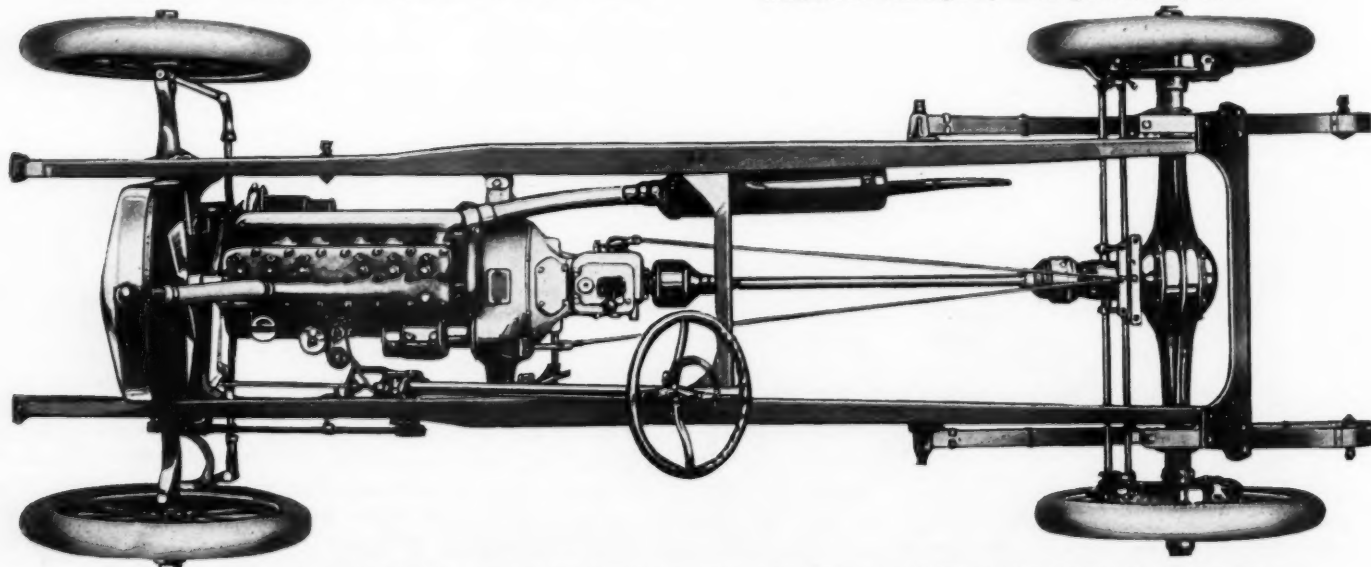
Remy equipment constitutes the electric plant of the car, ignition and lamps being taken care of by a generator with which is combined a magneto type distributor. The other portion of the two-unit system, the starter, drives through the flywheel by means of gearing inclosed in the flywheel housing.

From the engine power is transmitted through a dry plate clutch of the Detroit Gear & Mfg. Co. make. This design uses 13 disks, alternating asbestos face and steel. The gearset is made by the same concern and offers three speeds forward. New departure bearings are used throughout the gearset. The drive is taken through an open propeller shaft with universal at either end on the Hotchkiss system, the driving effort being carried through the three-quarter elliptic springs. A specially heavy forward attachment is provided for the lower half of the springs to take this extra effort. The rear axle is an American Gear & Mfg. Co. product, is of the floating type with large Gurney annular bearings and Brown-Lipe nickel steel spiral gears in the final drive. The steering is a Warner worm and full gear with an 18-in. corrugated rim and carries the horn button in the center.

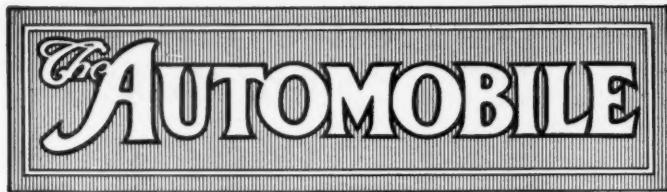
Braking system consists of internal and external brakes operating on $1\frac{3}{4}$ by 14-in. brake drums. Tires are 34 by 4 in. with Stanweld demountable rims. Equipment is complete on all models.



Madison six touring car, showing clean body lines



Plan view of Madison six chassis, showing the Hotchkiss drive with torque and thrust taken through the springs



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Banks and Automobiles

FINANCIAL America now recognizes the automobile. One of the largest banking institutions in the country calls it a great public utility. Bankers everywhere are ready to do their part in lending financial aid to the automobile industry—ready to help boost it and make it a still greater success. Dealers find a more open mind on the part of the banks as regards financing them and loaning on their stock.

Everywhere in financial circles the old antagonism against the automobile is rapidly giving way to a spirit of understanding and realization that the motor vehicle is bringing closer intercourse between all sections. They see what it is doing to increase property values in otherwise isolated districts. They know of its helpful influence through the greater general prosperity of the people as a whole, for this is at once reflected in their own business, which has increased in every financial district.

The bankers used to say that the vastly increasing use of automobiles was making the people extravagant. Now they realize that by opening up greater distances, making possible more thorough intercourse and decreasing non-productive transportation time the motor car has a very important place in the general scheme of things, and that it is really a factor for economy, all things considered. It is a necessity.

The Multicylinder V Engine

ABOUT a year ago the S. A. E. had McCall White's paper on the Cadillac eight, and this week J. G. Vincent gives his ideas on the twelve, treating the latter rather as a development of the eight so far as the V principle is concerned, but as a development of the six from the wider aspect of automobile design generally. The important point in Mr. Vincent's paper is the fact that his reasoning leads to the twelve entirely without regard to the eight.

Excluding interested parties, there is a remarkable tendency amongst engineers to regard both eight and twelve as here to stay, at least as long as the automobile remains much the same generally as it is now, but a point which is likely to be discussed vigorously at the meeting where the paper is read is whether we have yet done all possible with the six. Here opinion divides into two schools, one holding that the eight and twelve will between them drive the six almost out of existence, and the other that there is plenty of room for all types. Next year will show some sixes of a higher grade of engineering than most that have been made so far, and it is likely to be several years before the matter is settled either way.

Meanwhile it is interesting to observe how quietly the twelve has been accepted, which is explained no doubt by the fact that the eight has proved the V motor principle and proved the advantage of small impulses in quick succession. The eight and twelve together have had the effect of raising the standard of automobile engine design and construction for all types, but the effect of that raising is only apparent in very recent new designs and will not reach its full expression for at least another twelve months.

Before a company adopts a new product involving the expenditure of thousands of dollars for new tools and the scrapping of thousands of dollars of old, good reasons must be shown for this policy.

The All-Weather Car

WITH the coming of autumn and cooler weather, which naturally may be expected to follow, the car owner begins to consider the approach of winter. But this year, in a much more marked degree than ever before, the prospect is less likely to cool his ardor as an automobilist, for both automobile and body manufacturers are bringing out the widest assortment of all-weather bodies that has ever been put on the market.

These all-weather cars embody a combination of the best features of the conventional, open touring car and the limousine which used to be practically a monopoly with the wealthier automobilists, and have the added advantage that they may be converted from one to the other in a very short time, according to weather conditions and the mood of the owner. Every improvement in this direction of making the automobile an all-year comfort and convenience is to be commended, and the manufacturers should continue their efforts and surpass their already excellent designs.

Dealers to Blame for Car Shortage

Delay Unloading and Thus Hold Up Railroads, N. A. C. C. Traffic Managers Find

DETROIT, MICH., Sept. 14—*Special Telegram*—At to-day's meeting of traffic managers of the National Automobile Chamber of Commerce, Inc., there were representatives from the Dodge, Cadillac, Ford, Briscoe, Maxwell, Studebaker, Reo, Olds, General Motors, Willys-Overland, Hupmobile, Kelly-Springfield, Anderson electric, Chalmers, National, Mercer and Nordyke and Marmon companies.

The principal topic was the car situation and it was brought out that the automobile dealers are much to blame for the shortage of cars because of a great many delays from several days to sometimes more than two weeks before taking delivery of their automobiles. This not only causes prejudice to the railroads but greatly handicaps the manufacturers in getting back the cars from the roads. The railroads now threaten to charge the dealers \$5 a day instead of \$1 for delay in taking delivery.

It was also announced that the chamber had received assurance from almost all the railroads in the country that they will co-operate in the car matter. Many other minor topics were discussed.

Rittman Process a Success

WASHINGTON, D. C., Sept. 11—Secretary Lane cancelled a contract to-day made by the Department of the Interior with the Aetna Explosive Co. of New York, under which the company had agreed to expend \$200,000 in the development of the process discovered by Dr. Walter F. Rittman for the manufacture of benzol and toluol from petroleum. This action was taken because it is certain that the process is in such shape as to warrant its use by plants on a commercial basis.

Briscoe May Take Over Flanders Building

PONTIAC, MICH., Sept. 11—It is reported but not confirmed that Frank Briscoe is negotiating for one of the factory buildings making up the Flanders estate. It is said that Mr. Briscoe may start a new industry in the city.

Peerless to Build F.W.D.

CLEVELAND, OHIO, Sept. 11—An unconfirmed report is current here that the Peerless Motor Car Co. has received another large truck order from abroad, among which four-wheel-driven trucks are included and that arrangements have been made to manufacture

the latter under license from the Four Wheel Drive Auto Co., Clintonville, Wis. It is expected that for the next four months, twenty-five trucks will be manufactured daily, or a total of 3000 in that time.

It is said that a recent French order, amounting to 500 trucks has been split between the White and Peerless companies, the former getting the contract for 300 and the latter for 200. The Russian four-wheel-driven truck order is said to amount to 200.

New Pilot Eight and Six

RICHMOND, IND., Sept. 14—*Special Telegram*—The Pilot Motor Car Co., which has heretofore confined itself to making high-priced, high-powered cars has announced two new models at much lower prices for 1916. One of these is a six known as the six-45 to sell as five-passenger touring and four-passenger roadster at \$1,100; the other is an eight-cylinder, known as the eight-55 in two- and five-passenger form at \$1,785.

This gives four chassis for the 1916 Pilot line, the six-75 at \$2,485 and \$2,400; the six-55 at \$1,685, and the two new cars. The new pilot models are featured by double cowl streamline bodies, the four-passenger roadster being even more unusual it is called the Get Chummy type by the maker. In this car the front seats are individual with an aisle between which gives access to the rear seat which accommodates two people. The six-45 has an L-head 3 by 5-in. block motor, cantilever springs and Delco electric system. The eight-55 has 3 by 5½-in. cylinders and the valves are operated by a single camshaft. Wheelbase of this car is 126 in.

To Sell Cars Direct

In connection with the announcement of the new models a change in selling methods also is announced. Heretofore the sales have been handled entirely by the Pilot Car Sales Co., a separate selling organization, this arrangement now has been discontinued and the cars will be marketed by the Pilot Motor Car Co. through branch houses and distributors. George E. Seidel, president and general manager, has assumed active management of the company's affairs. Joseph W. Connor, formerly district sales manager for the Leyman Buick Co., Cincinnati, Ohio, has been appointed sales manager.

Ford Buys Tractor Plant Site

DETROIT, MICH., Sept. 24—*Special Telegram*—There is an unconfirmed report afloat that Henry Ford has purchased a 200-acre tract near Libertyville, Ill., for a demonstrating ground for the Ford tractor and that later an assembly plant will be erected there when the manufacture of tractors starts in Detroit.

Prest-O-Lite Buys Brown Battery

Also Purchases Four Special Maxwell Racing Cars—Rick- enbacher to Manage Team

INDIANAPOLIS, IND., Sept. 14—*Special Telegram*—The Prest-O-Lite Co., this city, has purchased the Brown-Smith Battery Co., Bloomington, Ind., which has specialized on batteries for house lighting purposes. This acquisition broadens the Prest-O-Lite battery line which heretofore included ignition and starting and lighting batteries.

At the same time, the Prest-O-Lite company has entered racing, purchasing from the Maxwell Co. the four special Maxwell racing cars which will be raced in the speedway circuit as a Prest-O-Lite team under the management of E. V. Rickenbacher. These are four-cylinder cars 3.75 by 6.75 and can be used with either eight or sixteen valves.

Two of these cars will be entered at the Sheepshead Bay speedway race, one driven by Rickenbacher and the other probably by Harry Grant. It is understood that the price was in excess of \$25,000, this to include repair parts damaged in practice or races during one year and engineering advisory service.

Mason Plant Brings \$35,600

WATERLOO, IOWA, Sept. 10—*Special Telegram*—The plant and assets of the Mason Motor Co. were sold yesterday to the Blackhawk Improvement Co., a recently organized concern whose members are interested in automobile construction for \$35,000, \$20,000 of which will be used to pay preferred claims on the Mason company. For some time past the company has been building and assembling cars for L. C. Erbes and the plant will continue in this work producing machines bearing the L. C. E. trademark.

Walker-Weiss Axle Adds Men

FLINT, MICH., Sept. 11—The Walker-Weiss Axle Co., which has been employing 350 men, is adding 200 to its force and is going to operate its plant night and day. Owing to the lack of houses in the city it has been difficult to get all the skilled workers needed as they generally look for good houses.

\$100,000 Hayes Truck Wheel Co.

ST. JOHNS, MICH., Sept. 11—The new Hayes concern which is now occupying the plant formerly operated by the St. Johns Table Co. will be operated under the name of Hayes Truck Wheel Co. It will be incorporated and have a capital stock of \$100,000. C. B. Hayes, president of the Hayes Wheel Co., Jackson, is president of the concern.

\$12,302,345 in July Exports

4118 Passenger Cars and
2469 Trucks Shipped—
Parts \$1,663,997

WASHINGTON, D. C., Sept. 13—The Department of Commerce announces that \$12,302,345 in automobiles, trucks and their allied parts, were shipped during the month of July, 1915, as compared with \$1,670,794 in the same month in 1914.

Passenger cars were valued at \$3,835,347 and numbered 4118 as compared with \$1,143,419 and 1265 in 1914. Trucks were valued at \$6,803,001 and numbered 2469 as compared with only \$106,400 and 50 in the same period in 1914. The parts amounted to \$1,663,997 against \$420,975 in 1914.

4908 Packards Built in Year

DETROIT, MICH., Sept. 14—Although the detailed annual statement of the Packard Motor Car Co. covering the fiscal year ending Aug. 31 will not be forthcoming for about a month, preliminary figures as to total business are available. The report will show that during this past fiscal year, a total of 4908 automobiles and trucks were built and sold. The total value of these vehicles, including parts and service for same, was \$15,553,650, approximately.

Norton Resigns as Case V.-P.

RACINE, WIS., Sept. 9—F. Lee Norton, vice-president and general manager of the J. I. Case T. M. Co., Racine, Wis., has resigned and will devote his time to the conduct of his large stock farm at Racine. Frederick Robinson, vice-president, resigned a short time ago. Mr. Norton was associated with the company twenty-six years and it is stated that he retains his financial interest in the company.

Grady Canadian Studebaker Manager

WALKERVILLE, ONT., Sept. 10—J. E. Grady has succeeded W. T. Bush as general sales manager of the Studebaker Corp. of Canada. After the factory gets abreast with the orders, Mr. Grady is expected to take a trip to western Canada. In future Mr. Bush will devote his whole time to the retail sales department.

Gasoline Lower in Northwest

TACOMA, WASH., Sept. 14—While the price of gasoline is inclined to soar in the eastern states, it has been gradually lowered in the Pacific Northwest. Figures obtained from the Standard Oil Co.,

Tacoma give a record of wholesale price on gasoline for the past year and are as follows:

Sept. 1, 1914—12½c.	Sept. 7—12c.
12 cts. until Oct. 22	Oct. 22 red. to 11 cts.
11 cts. until Feb. 2-15	Feb. 2 red. to 10 cts.
10 cts. until July 7	July 7 red. to 9½c.

Price of 9½ cents. wholesale still in effect Sept. 8.

Texas and Gulf gasoline are not sold in the Northwest, but instead Shell and Union gasoline are used in this field. These companies maintain the same prices as those put into effect by Standard Oil Co. Retailers making price from 1 cent to 1½ cents above wholesale price to customers.

Jay Succeeds Vail as Chairman of Maxwell Board

NEW YORK CITY, Sept. 14—At the meeting of the board of directors of the Maxwell Motor Co., Detroit, Mich., held here to-day, John P. Jay, Jr., vice-president and sales manager of the Pennsylvania Steel Co., Philadelphia, Pa., was elected a director and chairman of the board to succeed J. A. Vail who resigned last week, wishing to retire from business.

Wollering a Studebaker Director

SOUTH BEND, IND., Sept. 9.—M. F. Wollering, production manager of the Studebaker Corp., has been elected a member of the board of directors of the company. Mr. Wollering is a son of Fred Wollering, Milwaukee, and gained his experience in Milwaukee shops, becoming associated with Studebaker when that concern first embarked in the motor car field.

Portage on Cleveland Exchange

CLEVELAND, OHIO, Sept. 11—Portage Rubber common and preferred stocks yesterday were listed for trading on the outside board of the Cleveland stock exchange. There was outstanding April 30, 1915, the date of the last available statement, \$586,200 of 7 per cent cumulative preferred out of an authorized \$750,000 and \$472,900 common out of an authorized \$500,000. There are no bonds. No dividends are being paid on the common.

Ideal Light Car Co. Formed

COLUMBUS, OHIO, Sept. 10.—A new automobile manufacturing company has been launched in Columbus by the incorporation of the Ideal Light Car Co. with an authorized capital of \$100,000 by J. H. Axline, C. O. Howard, S. C. Hill, F. E. Hill and Barton Griffity. The company has been temporarily organized by the election of J. H. Axline, president and general manager; F. E. Hill, secretary and treasurer and S. C. Hill, vice-president.

Claims Front-Wheel-Drive Rights

J. W. Moakler Issues Patent Notice Stating All Makers of That Type Infringe

NEW YORK CITY, Sept. 13—Claiming United States patents priority for the front-wheel-drive, as used on motor vehicles at the present time, John W. Moakler, East Worcester, N. Y., has issued a patent notice dated August, 1915, stating that all manufacturers of front-wheel-driven vehicles are violating his U. S. patent No. 766,191, of Aug. 2, 1904, and that all parties making such vehicles, their agents and customers will be held responsible for damages.

The claims allowed in patent No. 766,191 cover broadly the use of a universal joint in proximity to the pivoted parts of a steering knuckle, either above or below the knuckle or at its center.

Mr. Moakler claims to have built a three-wheeled electric vehicle in June, 1888, and to have patented a four-wheel-driven, worm-driven electric vehicle under patent No. 500,022, dated June 20, 1893.

Motor and Accessory Manufacturers Adds Five Members

NEW YORK CITY, Sept. 11.—The following concerns have been added to the list of members of the Motor and Accessory Manufacturers: Eclipse Machine Co., maker of Eclipse Bendix starter and steering gears, Elmira, N. Y.; The John O. Heinze Co., starters and electrical apparatus, Springfield, Ohio; the Oakes Co., fans, horns, etc., Indianapolis, Ind.; William Shakespeare, Jr., Co., carbureters, Kalamazoo, Mich., and the Penberthy Injector Co., carbureters, 360 Holden Avenue, Detroit, Mich.

\$1,000,000 Du Pont Co. Formed

DOVER, DEL., Sept. 9—The Du Pont Co., New York City, has filed a charter here with a capital of \$1,000,000, to manufacture, sell and deal in and with automobiles, trucks, etc. S. A. Anderson, J. F. Curen, and S. B. Howard of New York City, are the incorporators.

Chemical Engineering in Columbia

NEW YORK CITY, Sept. 14—The department of chemistry of Columbia University has established a separate department of chemical engineering. The head of the new department will be Prof. M. C. Whitaker.

Bijur Strike Off

HOBOKEN, N. J., Sept. 13—The strike of 450 workers in the plant of the Bijur Motor Lighting Co., this city, since Aug. 20, has been declared off.

Reasons for Twelve-Cylinder Motor

Extracts from a Paper Read Before the Detroit Section of the Society of Automobile Engineers by J. G. Vincent, Vice-President of the Packard Motor Car Co.

DETROIT, MICH., Sept. 16—At the opening meeting of the fall season of the Detroit section of the Society of Automobile Engineers held here to-night, J. G. Vincent, vice-president of the Packard Motor Car Co., was scheduled for a paper on "The Reasons for the Twelve-Cylinder Motor." Some of the more important parts of Mr. Vincent's paper are here extracted as follows:

"While getting the data together for this paper, I came across a copy of my recommendation addressed to Mr. Henry B. Joy, president Packard Motor Car Co., written just after I had completed exhaustive experimental work with various types of motors, in which I finally recommended the adoption of the twin six type of motor in our cars. In this recommendation I went into the subject very thoroughly in order to put the entire situation before Mr. Joy in a manner to enable him to properly present it to the business men composing our board of directors, and I know of no better way to explain why we adopted this type of motor than to quote from this report, which I will do, in part, as follows:

How Many Cylinders?

"Now in regard to how far it pays to go in the number of cylinders, let us consider the possibilities of the twin four type of motor, as this is a type that had received considerable attention and seems to be the next logical step after the six.

"For the purpose of comparison, let us consider that we desire a motor of about the same cubic inch piston displacement as our Packard 338 six-cylinder motor, which is 4-in. bore by 5½-in. stroke and contains 414.7 cu. in. It would be entirely practical to design a twin four motor of practically this same cubic-inch piston displacement within the above-mentioned desirable bore-stroke limits; in other words, a motor of 3 7/16-in. bore by 5¼-in. stroke will contain just over 53 cu. in. per cylinder, or a total of just over 424 cu. in. Such a motor of proper design and workmanship would have certain advantages and disadvantages when compared with our 38 six-cylinder motor. I will outline them briefly, as follows:

"So far as the character of the *torque* is concerned, the twin four motor would have the advantage over the six by rea-

son of the more frequent impulses of lesser intensity.

"So far as weight is concerned, a twin four would have some advantage over a six, particularly in the crankcase, the crankshaft and flywheel, as the shorter crankshaft can be made smaller, both because it is shorter and because the light pistons and small impulses do not have the same tendency to twist the shaft.

"So far as smoothness is concerned, the eight would be better than the six at moderate speeds because the more even torque would show to advantage at these speeds, and the inherent vibration due to unbalanced inertia forces would not be a factor, but at the higher engine speeds, the advantage would switch to the six-cylinder motor, as the unbalanced inertia forces become a very important factor and in spite of the lighter pistons and shorter crankshaft, the vibration would be a great deal more pronounced in the eight than in the six. This is a very undesirable feature, because one of the reasons for using more cylinders is to increase the range of motor ability and at the same time increase its smoothness.

Accessibility Is Desirable

"So far as *accessibility* is concerned, the twin four is at a very great disadvantage when compared with the six, as the 90-deg. angle makes it impractical to mount the generator, water pump, starting motor, etc., in the usual place alongside the crankcase and just inside the frame. This makes it necessary to mount this equipment either below the frame or between the cylinder blocks. Any of the equipment mounted below the frame is, of course, exposed to mud and water, and in addition to being very inaccessible is very apt to be damaged. The larger part of these units are usually mounted between the cylinder blocks or in what might be called 'valve alley,' with the result that the valves are rendered very inaccessible, and this is not a desirable result, to say the least. The required angle of the cylinders also makes it very difficult to design into the car a proper substantial steering gear and still render assembling practical. In the best workouts that I have seen, the assembling and disassembling of the steering gear is a very difficult matter

and, in most cases, at least, it is necessary to remove the body and partially remove the motor in order to get the steering gear out.

"So far as the *turning radius* is concerned, the twin four is at a disadvantage when compared with the six, as the frame must be made wider than is necessary for the six-cylinder motor in order to get the steering gear in at all. An inch in width on each side of the frame will increase the length of the turning radius a great deal more than 3 or 4 in. added to the wheelbase. In other words, the amount that the wheelbase can be shortened in the twin four will not make up so far as turning radius is concerned, for the extra width required at the front end of the frame.

"All things considered, it was obvious that along with the acknowledged advantages obtained from the twin four, reappear the characteristics of the four which the six was designed to overcome, and the search for further refinement was, therefore, insistently pressed, as it was desired to obtain the advantage of the small-bore, high-efficiency, multi-cylinder motor without inheriting any disadvantages.

Properly Designed Six Is Balanced

"As mentioned above, the six-cylinder motor is in absolute theoretical and practical balance, providing it is properly designed with a crankshaft that is strong enough to take care of the inertia forces in order to enable them to properly cancel out.

"As further explained above, the only disadvantage of a six-cylinder motor is the fact that in order to get a reasonable size motor the crankshaft must be rather long and the inertia forces are rather large owing to the necessarily large pistons. Since a single six-cylinder motor is in perfect balance, however, there is no reason why we cannot combine with it another six-cylinder motor, V-type, and still have a motor that is in absolute theoretical and practical balance. In designing this twin six motor, however, it is necessary to set the cylinders at an included angle of 60 instead of 90 deg., as there will be six impulses per crankshaft revolution instead of four, and a circle divided into six parts gives 60 deg. In other words, the impulses follow each other at inter-

vals of 60 deg., and this, of course, determines the angular position of the cylinders.

"Let us see how this type of motor compares with the six and the twin four as regards advantages and disadvantages.

"It is obvious that the character of the *torque* of this twin six motor is bound to be 50 per cent better than the twin four and 100 per cent better than the single six. Six impulses per crankshaft revolution blend together so closely as to make it absolutely impossible to distinguish any pause between impulses, even at very low engine speeds pulling through traffic on up-grades. The only thing that I can liken it to is the action of steam.

"So far as *weight* is concerned, the twin six motor is just about a stand-off as compared with the twin four, but lighter than the single six. The twin six motor is slightly longer than the twin four, but owing to its smaller bore and stroke and lesser angle it makes up in absence of width for what it exceeds the twin four in length. The weighing up of actual motors proves this to be a fact.

"Owing to the perfect balance of the six-cylinder principle, this twin six motor is absolutely *smooth* at all speeds.

Twin Six Has Accessibility

"So far as *accessibility* is concerned, the twin six motor is far superior to the twin four and just as good as the single six. The 60-deg. included angle allows us to build a 424-cu. in. motor 21 1/2 in. wide over-all, as compared with 28 9/16 in., as in the case of the twin four. This allows the placing of the generator, water pump, starting motor, etc., in the usual place alongside the crankcase and between it and the frame, without widening the frame over the Packard narrow standard. It also allows the easy assembling and disassembling of a properly designed steering gear. This leaves only the carbureter to be placed between the cylinders, and by placing it well above the motor 'valve alley' is left entirely open and all valves are easily accessible for adjustment or replacement.

"So far as the *turning radius* is concerned, the twin six is far superior to the twin four and slightly better than the single six, as it assembles into the same width of frame as the single six, but allows a substantial reduction in the length of wheelbase.

The tremendous difference in power output of different motor types at the higher speeds is, of course, partly due to the increased compression, partly to the more effective valve area, but largely, I believe, to the lightness of the reciprocating parts and the consequent tremendous reduction in friction. In this connection it is interesting to note that both

the single six and twin six motors have valves whose diameter in the clear equals half the bore, but that with the single six valves lifting 3/8 in. and the twin six only 5/16 in., the effective valve opening is approximately 22 per cent greater in the twin six. This is due to the fact that the piston area decreases as the square of the diameter, while the effective valve opening decreases directly with the diameter.

The power curve of the single six cylinder motor was, of course, made from a 338 motor such as we used last year, and the output of the high-efficiency six-cylinder motor mentioned in my report to Mr. Joy was considerably higher, as it ran up to approximately 75 hp. at 2200. But, in order to obtain this additional power, I not only had to lighten the reciprocating parts, but I also had to raise the compression, in order to obtain more efficient combustion; or, in other words, I had to increase the intensity of each explosion. This resulted in exactly what we were not looking for, a rougher motor than the 338, while the public was demanding a smoother one, in connection with more range of ability. I believe that the curve, taken from the well limbered up 338 motor represents about the maximum output that can be obtained from a single six-cylinder motor without raising compression to the point where the result will be objectionable to the user. Whereas, on the other hand, power can be obtained from a twin six motor with a degree of smoothness far in advance of the result obtained from the six-cylinder motor, even with its considerably smaller power output.

The Question of Gear Ratio

"While this twin six motor has the ability to turn up to 3000 r.p.m.—smoothly and safely—its magnificent torque at low speed, makes it possible to use a gear ratio that keeps the motor down to a point very little above that of so-called slow speed motors. As our 135 car, equipped with twin six motor is approximately 300 lbs. lighter than our 338 and has on an average 10 per cent more power up to 1500 r.p.m., as outlined above, it will be readily understood that we could have used our 338 gear ratio and secured an excellent performance. I have driven the 135 twin six car, equipped with our standard 338 gear ratio, i. e., 25 m.p.h. at 900 r.p.m. of the motor, and found its performance to be excellent. As this motor has the ability to turn up to high speed without any undue strains on the bearings, however, we decided to make the gear ratio slightly lower, in order to give our customers a measure of ability that would be satisfactory under all conditions. We, therefore, adopted a 23.5 mile gear ratio, or, in other words, when the twin six motor is turning 900 r.p.m.

the car is traveling but 1 1/2 miles slower than was the case in last year's single six 338 car. This means at 70 m.p.h., the motor only turns approximately 2700 r.p.m.

"While I have shown by the above that we are not running our engines at extremely high speeds, I still want to make the statement that we could run them at high speeds, that is, up to 3000 r.p.m. and have it safer than a six-cylinder motor at considerably lower speed.

"In this connection, the following comparisons are very interesting. This table shows the comparative weights of the rotating and reciprocating parts and the resulting bearing pressures of not only our 338 single six-cylinder motor and our new twin six motor, but I have also added, as a matter of general information, the corresponding data of the high-efficiency six-cylinder 338 motor mentioned in my report to Mr. Joy:

	338 Six,	Special 338 Six,	Twin Six,
Piston assembly, complete with rings, piston pin and set screw.....	Lb. 4.125	Lb. 2.11	Lb. 0.814
Connecting rod, upper end	1.38	.828	.625
Connecting rod, lower end	3.31	2.421	1.52

The following table gives a comparison of forces due to gas pressure and inertia at 2000 r.p.m. of the same motors.

	Lb	Lb.	Lb.
Inertia of one piston assembly complete.....	2,130	1,140	492
Centrifugal forces of one connecting rod, lower end	1,030	754	430
Centrifugal forces of one pair of connecting rods, lower ends .....	.....	.....	860
Crank pin bearing pressure per square inch, due to inertia.....	768	433	379
Crank pin bearing pressure per square inch, due to gas pressure....	916	916	871

As a matter of general information, I will state that the lightening of the parts in the special six-cylinder motor was accomplished by making the connecting rods out of alloy steel and machining them all over and by using alloy pistons. In other words, the rotating and reciprocating parts of this special motor were up to the same standard of engineering as our twin six motor, which makes the comparison of this motor with the twin six very interesting. It will be noted that on account of the lightness of the rotating and reciprocating parts of the twin six motor, the bearing pressures, due to inertia, at 2000 r.p.m., are far below the corresponding pressures, due to gas pressure on the piston, which makes it quite clear that the speed of the motor would have to be raised far above 3000 r.p.m. in order to make the pressure, due to inertia, come anywhere equal to ordinary working pressure of the bearings due to gas pressure.

There are so many interesting engineering problems in connection with the designing of a twin six motor that

I could go on at considerable length, but fear that this paper has already grown too long. I have purposely stuck to a discussion of the results desired and the broad underlying principles of motor design and have refrained from discussing motor details. There are, of course, a great many possible arrangements of a lot of the details of construction of a twin six motor, and in the design of our motor I can only say that we considered each detail as carefully as we knew how, and, after exhaustive research work, selected what we thought to be best. No doubt the discussion of this paper will run somewhat into the details of construction, and I will be very glad indeed to answer any question and give you reasons for our particular arrangement."

Joy Favors North Route Around Salt Lake for Highway

SALT LAKE CITY, UTAH, Sept. 7.—In a recent letter to Chas. Tyng, counsel for Utah for the Lincoln National Highway, Henry B. Joy, president of the highway association, points out the necessity for improving the road south of Great Salt Lake and says that unless this is done Salt Lake City cannot expect to have the automobile travel come by this route. President Joy said: "There is no doubt in my mind, after having driven the southern route in June and having talked with dozens of tourists and citizens of Utah, but what the northern route is to-day the best and most drivable road."

McGraw Makes \$300,000 Additions

EAST PALESTINE, OHIO, Sept. 14.—Contracts have been let by the McGraw Tire & Rubber Co., this city, for additional steel and brick buildings and machinery to cost \$300,000. Three additions are covered by the contracts awarded, as follows: a 195-ft. three-story extension to the vulcanizing building; a 98-ft. three-floor annex to the present mill room, and a 150 by 66 ft. three-floor addition to the compounding department.

In addition to the 98-ft. mill room extension, this department will be enlarged by transferring the present compounding room to its new quarters in the 150 by 66 ft. extension to the main building.

All buildings will be connected with overhead bridges and tunnels which permit direct routing of material through various departments of manufacture.

New mills, calenders, with direct motor drives, elevators, conveyors and other equipment have been ordered, and it is anticipated that all will be in full operation by Nov. 1, 1915. The increased floorspace will approximate 800,000 sq. ft., and the daily output of the plant will be doubled.

Trade Review of the Week

State Fair Helps Detroit Sales—Factories Continue Unabated Activity—Other Sections

DETROIT, MICH., Sept. 14.—Stimulus to the business of many of the Detroit dealers was given last week by the State Fair held here. This occasion is recognized as an excellent chance for the selling and showing of cars to the farmer element of the State as well as offering a means of gathering a good-sized prospect list among local intending buyers.

In the factories, there is little change over the previous week, activity everywhere being with the aim of keeping pace with demand. Packard has now started shipments of its Twin Sixes, although none of them went out last week. It is expected that before the present week is over there will be twenty-five of them out.

Orders Are Plentiful

From the Scripps-Booth Co. comes the information that a French dealer has contracted for 500 cars within the next year.

Ford factory sales continue to be very strong. The concern is between 80,000 and 90,000 cars behind orders now, which is practically the same as it has been right along. The daily output last week averaged about 1200 cars, this number being made in the parent plant and in the assembly branches throughout the country. At Detroit, the daily average has been running about 500. Ford officials state that there is no prospect of a slackening.

Factories look for increased war business following the completion of the present war loan. It is hard to see how some of them could take on more of this work, but it, of course, would largely be confined to the truck field.

50 to 100 Per Cent Increase in Minneapolis Sales Expected

MINNEAPOLIS, MINN., Sept. 13.—Automobile trade conditions for this territory as gathered from the attendance at the automobile exhibit at the Minnesota State Fair, Sept. 6-11, and at the agencies in Minneapolis and St. Paul, are for a large business.

Conservative men place the probable increase in sales for 1915-1916 over 1914-1915 season at from 50 per cent to 100 per cent. Some even go higher where they have popular price lines of machines. With a crop in sight for Minnesota of some \$300,000,000 and more than \$600,000,000 for the ninth federal bank district centering in Minneapolis, the sales possibilities are staggering to the dealers.

The State Fair show developed no more than the normal week's report of new agency contracts, but it showed that the farmer is going to buy automobiles this fall when he realizes on his crops. Some five salesmen for each of the forty-three exhibits of automobiles at the fair were busy most of the time, and the people asking questions were the direct buyers of cars.

A New Caille Perfection Motor

DETROIT, MICH., Sept. 15.—*Special Telegram*—The Caille Perfection Motor Co., which for the past fifteen to twenty years has been making gasoline and especially marine engines, will start the manufacture of automobile motors within the next thirty days with a light six-cylinder engine designed by Ralph Lewis, former chief engineer and general manager of the Beaver Motor Mfg. Co.

Opinion Rendered in Horn Suit

NEW YORK CITY, Sept. 15.—In the suit of the Lovell-McConnell Mfg. Works vs. the General Auto Supply Co., Judge A. Hand has written an opinion in which he states that patent No. 1,105,324 issued to George C. Dean, infringement of claim No. 7 of which was the cause of the suit, is void for lack of invention. For this reason the opinion states that the bill should be dismissed. The defendants, the General Auto Supply Co., according to the opinion, have made no contention of non-infringement on the above patent, but anticipation and lack of invention. The particular point in claim seven, which the suit hinged upon, reads—"And a casing having a cylindrical threaded wall and transverse wall, said transverse wall being spaced from and substantially parallel to said diaphragm and serving as a bearing for one end of the armature shaft, . . . the threaded engagement of said shell and said casing serving to adjust the position of said rotor in respect to said diaphragm."

The opinion states that all the elements seem old, but the combination was what was claimed to be new and useful, particularly the threaded engagement which serves as an adjustment, and also a substantially air-tight chamber in the rear of the diaphragm in which air is compressed and expanded during the operation of the horn. According to the opinion, a similar threaded engagement appears in British patent to Rogers No. 23,802 and French patent to Monnot No. 422,256. The air space is substantially the same as in Miller Reese Hutchison's patent No. 1,411,463. Therefore, concludes the opinion, no novelty can be seen in the combination and the patent is void for lack of invention and the bill should be dismissed. The case is in the U. S. district court for the southern district of New York.

212,882 Registration in N. Y.

Ohio 168,000, Illinois 166,886,
Pennsylvania 151,523 and
California 150,232

NEW YORK CITY, Sept. 14—Registrations in the four leading automobile states are booming. Up to Sept. 1, according to the figures collected by the Ohio State Automobile Association, there were 849,531 cars registered in the five leading states, New York, Ohio, Illinois, Pennsylvania and California.

New York State leads 212,882; Ohio is second with 168,000; Illinois, third, with 166,886; and Pennsylvania, next with 151,523. California is close to Pennsylvania with 150,232 registrations.

10,800 Cars Licensed in Vermont

MONTPELIER, Vt. Sept. 11—The receipts from automobile registration in the State of Vermont during the period between March 1 and Aug. 1, 1915, amounted to \$175,992.31. This amount exceeds the receipts of any previous year, the period between March, 1914, and March, 1915, having brought forth registration receipts of \$160,362.10, the largest up to that time. The number of cars up to Aug. 1, 1914, is nearly 10,800, or a ratio of more than one automobile to every thirty-two persons living in the state.

Daniels 8 at \$2,350

READING, PA., Sept. 11—The Daniels eight which, as was stated in THE AUTOMOBILE for Sept. 2, is to be built by the Daniels Motor Car Co., this city, the president of which is Geo. E. Daniels, who was president and general manager of the Oakland Motor Co., Pontiac, Mich., will be a car built practically to order, to sell for \$2,350. The wheelbase will be 127 in. and the tires 34 by 4½. Unusual attention will be given to the finish and equipment of the seven-passenger body, which will have a double cowl, heavy mahogany rail all around the top, long grained hand-buffed leather upholstery, mahogany cabinet fittings and other luxurious features.

3¼ by 5 Motor

The motor will have V-type L-head cylinders 3¼ by 5, giving a rating of 33.8 under the S. A. E. formula; the cylinders will be in two blocks with integral intake manifolds and bolted-on exhaust pipes and the valves will be actuated by a single camshaft carrying sixteen cams. Staggering the cylinder blocks permits placing the big ends of the connecting-rods side by side on the crankpins, which are made sufficiently

long for the purpose. Water circulation will be by duplex centrifugal pumps, lubrication by pressure feed, ignition, lighting and starting by the Westinghouse system. The carbureter will be a Zenith.

A Brown-Lipe-Chapin three-speed gearset will form a unit with the motor, the disk clutch will run dry and will have a ball-bearing release. Two Spicer universals will be used on the propeller shaft, which will be uninclosed; drive will be taken through the springs, and an arm will resist torque stresses.

Vacuum Fuel Feed

Three-quarters construction will be employed for the rear axle, which will have taper roller bearings, spiral bevel gears and pressed steel housing. Rear springs will be semi-elliptic, underslung, 2½ in. wide. The gasoline tank, of 20 gal. capacity, will be hung at the rear, a vacuum system feeding the carbureter.

Can't Shoot from Car in Wisconsin

MILWAUKEE, WIS., Sept. 9—It is lawful to travel to hunting grounds in a motor car, but unlawful to shoot game birds or animals from a car, according to the ruling of the attorney general of Wisconsin. The last Legislature passed a law prohibiting shooting at game from cars, bringing up the question of whether or not such prohibition covered driving to the place where it was intended to hunt. The attorney general interprets the law, for instance, to make it unlawful for a motorist-hunter to scare up a covey of birds with his car and then alight from the car and shoot the birds.

Non-Glare Law in Dallas

DALLAS, TEX., Sept. 9—The city of Dallas now has an automobile dim light ordinance. The law became effective only recently. It provides a fine of from \$5 to \$200 for a violation. It applies only to the corporate limits of the city. A move is on foot to have the Legislature pass a dim light law that will cover the State. So far as Texas is concerned Dallas is the first city to enact this ordinance.

To Build Waco Car in Seattle

SEATTLE, WASH., Sept. 9—The Western Automobile Co. has recently been incorporated in Seattle to manufacture the Waco car. Those interested in the new concern are C. A. Cawley, G. L. Grant and S. W. North. A large factory building has been leased at Rainier Avenue and Lane Street for manufacturing purposes. The first Seattle-built car, a Waco, has already run 2000 miles and delivery of cars is promised for March 1, 1916.

1916 Russell-Knight —Two Bodies

Refinements a Feature—Five-Passenger Type Sells for \$2,650 and Seven \$2,750

TORONTO, ONT., Sept. 11—Several refinements are noted in the 1916 Russell-Knight 32 made by the Russell Motor Car Co., Ltd., West Toronto, Canada. It is made in two body styles, five and seven-passenger the former selling for \$2,650 and the latter \$2,750. The body is the conventional streamline design with doors having concealed hinges. In the equipment are included Bijur electric starting and lighting system, new dome fenders, improved headlights, power tire pump, Warner speedometer and clock and demountable rims with one spare.

The engine is a four-cylinder, 4¼ by 5½, rated at 32 hp. The cylinders are cast in pairs with separate removable heads, while the sleeves have 2¼ in. travel. Cooling is accomplished by a centrifugal pump through the cylinder water jackets to a large cellular radiator. A high-tension magneto independent of the lighting and starting system furnishes the ignition. Force-feed lubrication is used, with a special regulator that is said to cut down all consumption.

The Russell-Knight uses a multiple-disk clutch running in oil. It has a selective gearset with three speeds forward and one reverse. Center control and left drive are used. Floating Timken rear axles with worm-bevel gears are to be found on this car; also semi-elliptic springs in front and three-quarter elliptic in the rear. Wheelbase is 120 in.; tires, 36 by 4½; wheels, artillery type with demountable rims.

The upholstery has Turkish type cushions with wood frames. Colors are royal blue for the body and running gear with an option of brewster green or deep wine.

Haydock Car at \$720

CINCINNATI, OHIO, Sept. 9—The Haydock Motor Car Co., located at Richmond and Carr Streets, Cincinnati, Ohio, announces the completion of a four-cylinder automobile, called the Haydock. The car is of the lighter type and sells for \$720.

No Successor for Poole

DETROIT, MICH., Sept. 13—No successor has been named by the Hupp Motor Car Co. to take the place of John L. Poole, who was European export manager of the company for the last five years.

Mexican Border Work Tests Trucks

Conveying 4000 Troops During Controversy — Encounter Bad Road Conditions

FORT SAM HOUSTON, TEX., Sept. 11—What is said to be the severest and most practical trials that were ever made of trucks and automobiles in actual military field service by the United States army are now in progress in the lower Rio Grande region of Texas, where more than 4000 troops are operating against raiding bands of Mexican outlaws.

Conditions Are Trying

The conditions under which the new adjuncts to the transportation department of the army are being operated are particularly trying. The border country is almost entirely lacking in good roads, with the exception of a limited system of improved highways radiating out of Brownsville and extending only short distances to nearby towns. In order to reach many of the more remote patrol camps with trucks carrying supplies it was found necessary to cut a road through an almost impenetrable wilderness of chaparral. The low-growing brush that covers the whole country is all thorn-bearing. The mesquite, the cats-clay, the prickly pear and a variety of other plant life, indigent to the border, are covered with thorns that are an ever-present menace to automobile tires. The lack of any convenient repair shops makes it necessary for the motor transportation equipment to provide its own means for its upkeep.

It requires a considerable amount of supplies to keep an army of 4000 men going and the trucks are kept constantly busy. It is planned to greatly increase the number in service.

In former years, when the War Department maintained large garrisons of soldiers at Fort Brown, Fort Ringgold and Fort McIntosh, all military posts on the lower Rio Grande frontier, there was a Government road that extended up the river for a distance of about 250 miles, connecting these different stations. The abandonment of the road for military purposes several years ago caused the highway to rapidly fall into bad condition and there are now long stretches of it that are impassable for almost any kind of vehicle. Temporary improvements have been made recently to some sections of the old highway and plans are on foot to rehabilitate it along its entire length.

Equal to the Test

It is stated that the motor trucks which are now in use on the border have proved equal to the many hard

tests that they have been compelled to undergo. The chief difficulty has been the lack of roads. The patrol camps are often situated close to the river bank in localities that are almost inaccessible.

5-Year Blair Order

NEWARK, OHIO, Sept. 10—The Blair Motor Truck Co., Newark, Ohio, has received an order for motor trucks to be delivered in fixed quantities over a period of five years. Although the officials of the company are reticent about the details of the order, it is understood that the order emanates from one of the large European exporters with headquarters in New York City and that the number to be delivered monthly exceeds thirty. These trucks, it is understood are to be 3-tonners and of the gasoline, worm-driven type which has been standard with the Blair company for several years. Another order for gasoline-electric vehicles made by the same concern is pending. It is emphatically stated that it is not a war order. The plant has been thoroughly rehabilitated for the steady demand upon it that will result and J. P. McCune, general manager, is arranging for the requisite materials.

Bell Forced to Expand

YORK, PA., Sept. 14—Increased production and the demand for cars from its agents have caused the Bell Motor Car Co. to start work this week on the erection of a large addition at its plant along the Columbia & Frederick division of the Pennsylvania Railroad at the intersection of Center Street. The building will be a one-story frame structure of the saw-tooth type, 80 ft. by 60 ft. in dimensions. It will be used as an assembling room and paint shop. The company's rapidly growing business has made it necessary to seek larger quarters and efforts are now being made to secure a site for the erection of a large modern daylight factory building. The present building is leased by the company. Work on the addition is being rushed and it is expected to have it completed within two weeks. The company will have about 25,000 sq. ft. of floorspace.

The daily production of the plant is being increased and an average of one and two cars are being built every day. Night work is now in progress. It is the aim of the company to increase this production to ten cars a day.

McCord Buys Wyandotte Plant

DETROIT, MICH., Sept. 11—The McCord Mfg. Co., which makes the McCord radiators, McKim gaskets and other automobile accessories, has purchased a plant at Wyandotte, Mich., and will make its gaskets there. At least 125 men are to be employed.

43 Truck Makers in P. O. Bids

To Furnish Twenty or More Gasoline Trucks in Fiscal Year Ending June 30

WASHINGTON, D. C., Sept. 8—Under a call for bids for furnishing twenty or more gasoline trucks for the postal service during the fiscal year ending June 30, 1916, the purchasing agent of the post-office department to-day opened forty-three bids from various manufacturers and dealers. The quantities to be purchased are five or more of ½-ton capacity; five or more of ¾-ton capacity; five or more of 1½-ton capacity and five or more of 3-ton capacity. It is possible before the end of the contract year that the department will purchase 100 trucks under the propositions received to-day. The contracts are expected to be awarded on or before Oct. 1, next.

The bids were submitted under these classifications: A, trucks of ½-ton capacity, complete with body; B, trucks of ¾-ton capacity, complete with body; D, trucks of 1½-ton capacity, complete with body; DD, trucks of 1½-ton capacity, with slight changes in specifications from class D trucks; F, trucks of 3-ton capacity; FF, trucks of 3-ton capacity, with slight changes in specifications from class F trucks. The bidders and their prices were as follows:

O. K. Motor Truck Co., Flint, Mich., f.o.b. Flint, Class B, \$975, \$975, \$1,000, \$975, \$1,025, \$975, \$978.
 Warren Motor Truck Co., Warren, Ohio, f.o.b. Warren, Class B, \$1,550, \$1,450; Class D, \$1,885, \$1,785; Class DD, \$1,925, \$1,825; Class F, \$2,550, \$2,450; Class FF, \$2,550, \$2,450.
 Union Garage Co., Washington, D. C., f.o.b. Washington, Ford, Class A, \$600.
 F. N. Harper, Washington, D. C., f.o.b. Toledo, Overland, Class A, five bids, \$830.
 Commercial Garage, Washington, D. C., Bessemer, Class B, three bids at \$1,225, \$1,175, \$1,250, \$1,225; Class D, \$2,090, \$2,025, \$2,090, \$2,065, \$2,090, \$2,205; Class DD, \$2,090, \$2,025, \$2,090, \$2,065, \$2,090, \$2,205; Class F, \$3,280, \$3,305, \$3,280; Class FF, \$3,350, \$3,375, \$3,350.
 Tiffin Wagon Co., Tiffin, Ohio, Class B, \$1,244, \$1,297, \$1,244, \$1,322, \$1,297; Class D, \$1,738, \$1,660, \$1,685, \$1,713, \$1,660; Class DD, \$1,742, \$1,664, \$1,689, \$1,717, \$1,664; Class F, \$2,263, \$2,238; Class FF, same bids as Class F.
 Semmes Motor Co., Washington, D. C., Class A, Wilcox, \$1,210; Vim, \$775; Class B, Wilcox, \$1,775; Class D, Wilcox, \$2,050; Class D, \$2,100.
 Charles A. Leichter, Chicago, f.o.b. Detroit; Class A, three bids at \$831.50, \$800; Class B, three bids at \$1,872.50, \$1,912.50; Class DD, four bids at \$1,950, \$1,990; Class FF, \$3,300, \$3,275.
 Wadsworth Mfg. Co., Detroit, f.o.b. Detroit, Ford, Class A, \$580.80, \$578.80, \$591.80, \$578.80, \$590.80, \$578.80.
 Dart Motor Co., Waterloo, Iowa, f.o.b. Washington, Class A, two bids at \$1,145, \$1,095, \$1,180; Class B, two bids at \$1,715, \$1,665, \$1,750; Class D, \$2,265, \$2,190, \$2,300, \$2,265, \$2,365; Class F, \$3,190, \$3,165.
 Miller Bros. Automobile & Supply House, Washington, D. C., f.o.b. Washington, Ford, Class A, \$638.50, with various supplemental bids; Class B, Flint, \$1,364.
 Commercial Automobile & Supply Co., Washington, Studebaker; Class A, \$940, \$965; Class B, \$960, \$985; this bidder also made several supplemental bids for equipment.
 Peerless Motor Car Co., Cleveland; f.o.b. Cleveland; Class F, \$3,455, \$3,410; Class FF, same prices as Class F.
 Lippard-Stewart Motor Car Co., Buffalo,

f.o.b. Buffalo; Class A, \$996.50, \$1,016.50, \$996.50; Class B, \$1,438, \$1,428, \$1,463, \$1,438, \$1,466, \$1,438; Class D, \$2,140, \$2,115, \$2,143, \$2,115, \$2,115; Class DD, same prices as Class D.

Commerce Motor Car Co., Detroit, f.o.b. Detroit; Class B, \$975, \$995, \$985, \$1,030, \$1,015.

DeKalb Wagon Co., DeKalb, Ill., Class D, \$2,175, \$2,100, \$2,125, \$2,100, \$2,100; Class DD, same prices as Class D.

International Harvester Corporation, Chicago, f.o.b. Akron, Ohio, Class A, five bids at \$1,040, \$1,000; Class B, \$1,040, \$1,000.

Duplex Power Car Co., Charlotte, Mich., Class F and FF, \$3,300.

Buick Motor Co., Detroit, branch, f.o.b. Detroit, Class B, \$1,340.90, \$1,337.39, \$1,340.90, \$1,330.90.

Touraine Co., Philadelphia, Pa., f.o.b. Philadelphia, Class A, four bids at \$835, \$865.

Mais Motor Truck Co., Indianapolis, f.o.b. Indianapolis; Class D, \$2,550, \$2,515, \$2,550, \$2,500; Class DD, same prices as Class D; Class F, \$3,050, \$3,025; Class FF, same prices as Class F.

Packard Motor Car Co., Detroit, f.o.b. Detroit; Class D, \$2,712.50, \$2,682.50, \$2,742.50, \$2,682.50, \$2,707.50; Class DD, \$2,722.50, \$2,692.50, \$2,752.50, \$2,692.50, \$2,717.50; Class F, \$3,645, \$3,505.85; Class FF, \$3,645, \$3,585.

Kelly-Springfield Truck Co., Springfield, O., Class D, \$1,875, \$1,900, \$1,925, \$1,950, \$1,875, \$1,900; Class DD, same prices as Class D; Class F, \$3,050, \$3,000; Class FF, \$3,125, \$3,075.

Four Wheel Drive Co., Clintonville, Wis., Class F, \$4,400 and \$4,350, both less 20 per cent; Class FF, same prices as Class F, with same discount.

White Co., Cleveland, Class B, \$1,970, \$1,970, \$1,985, \$1,970, \$1,970, \$1,958; Class D, \$2,720, \$2,705, \$2,720, \$2,708, \$2,720, \$2,720; Class DD, same prices as Class D; Class F, \$3,315, \$3,303; Class FF, same prices as Class F.

Thos. B. Jeffery Co., Kenosha, Wis., Class D, \$2,785, \$2,760, \$2,760, \$2,750, \$2,760, \$2,860; Class DD, same prices as Class D; Class F, \$3,900, \$3,890; Class FF, same prices as Class F.

Locomobile Co. of America, Bridgeport, Conn., Class F, \$4,022.50; \$3,950; Class FF, same prices as Class F.

Dorris Motor Car Co., St. Louis, Class B, four bids at \$1,885, \$1,860, \$1,845.

Couple Gear Freight Wheel Co., Grand Rapids, Mich., f.o.b. Grand Rapids; Class F, \$4,000, \$4,000; Class FF, same prices as Class F.

Standard Motor Truck Co., Detroit, f.o.b. Detroit; Class D, \$1,885, \$1,850, \$1,875, \$1,850, \$1,850; Class DD, same prices as Class D; Class F, \$2,480, \$2,450; Class FF, same prices as Class F.

General Motors Truck Co., Pontiac, Mich., Class B, \$1,250, \$1,295, \$1,250, \$1,275, \$1,250; Class D, \$2,045, \$2,000, \$2,025, \$2,000, \$2,000, \$2,125; Class DD same prices as Class D.

Sterling Motor Truck Co., Milwaukee, m f.o.b. Washington or New York; Class B, \$1,050, \$1,040, \$1,075, \$1,050, \$1,080, \$1,050; Class F, \$3,150, \$3,100; Class FF, \$3,300, \$3,270.

Denby Motor Truck Co., Detroit, f.o.b. Detroit; Class B, \$1,075, \$1,100, \$1,075, \$1,101, \$1,135; Class D, \$1,690, \$1,665, \$1,700, \$1,665, \$1,655, \$1,725; Class DD, \$1,690, \$1,665, \$1,725, \$1,690, \$1,690, \$1,740.

Avery Co., Peoria, Ill., Class FF, \$2,500, \$2,480.

Jos. W. Moon Buggy Co., St. Louis, f.o.b. St. Louis, Class D, \$1,650, \$1,620; Class DD, \$1,675, \$1,645.

C. L. Barker, Norwalk, Conn., Class D, \$1,565, \$1,540, \$1,565, \$1,540; Class DD, \$1,575, \$1,550, \$1,575, \$1,550.

Sandow Truck Co., Chicago, Class D, chassis only, \$1,625; with body, \$1,920, \$1,875, \$1,905, \$1,875, \$1,875, \$1,900; Class DD, chassis only, \$1,625; with body, \$1,935, \$1,890, \$1,920, \$1,890, \$1,890, \$1,915; Class F, chassis only, \$2,565; with body, \$2,945, \$2,915; Class FF, chassis only, \$2,555; with body, \$2,935, \$2,905.

Corbett Auto Co., Henderson, N. C., Class D, \$2,050, \$2,000, \$2,025, \$2,000, \$2,075, \$2,000, \$1,950.

Baalstrum Co. Battle Creek, Mich., Class A, \$1,285, \$1,283, \$1,285, \$1,277; Class B, \$1,375, \$1,373, \$1,375, \$1,363.

Reck's Son, Cedar Rapids, Iowa, Class B, \$1,200, \$1,175.

Service Motor Truck Co., Wabash, Ind., f.o.b. Washington; Class B, \$1,492, \$1,468; Class D, \$2,068; Class DD, \$2,100; Class F, \$2,744; Class FF, same prices as Class F.

Gabriel Auto Co., Cleveland, Ohio, f.o.b. Cleveland; Class B, \$1,700, \$1,690, \$1,700, \$1,675, \$1,735, \$1,700; Class D, \$2,200, \$2,175, \$2,235, \$2,200, \$2,200, \$2,200; Class DD, same prices as Class D.

Federal Motor Truck Co., Detroit, f.o.b. Detroit; Class D, \$2,090, \$2,070, \$2,107.50, \$2,090, \$2,090, \$2,090; Class DD, same prices as Class D.

Baldwin Locomotive Builds Trucks

300 Under Construction at Eddystone Plant—Flat Iron Wheels and Trailers

PHILADELPHIA, PA., Sept. 11—Three hundred trucks are being made at the Eddystone plant of the Baldwin Locomotive Works for use by the Russian army. It is understood that more trucks will be built later and that the 20-acre plant the company is building will probably be used in carrying out the large war orders. This company is also doing a large parts business for a prominent tractor concern in this State.

Fifty Are Finished

The trucks being built for Russia, fifty of which are already finished, run on flat iron wheels rigged to prevent skidding. When in use, several small trailers will be attached. They will be used to transport foodstuffs and merchandise to railroad and water terminals during the war, as well as to haul munitions.

Republic Truck Adds Three New Buildings

ALMA, MICH., Sept. 8—During the last thirty days the Republic Motor Truck Co. has started the erection of three new factory buildings, which will provide a total of 54,500 more square feet of floor space. Work on the latest addition was begun a few days ago. This structure will be one story high and have 35,000 sq. ft. of floorspace. The company will employ at least fifty more men when the buildings are ready. Production at this time is being pushed to the limit. Orders are far ahead of any previous year's business, and will keep the plant running for a long time with a full force.

Canadian Ford to Build Tractors

DETROIT, MICH., Sept. 9—Ford tractors are to be made by the Ford Motor Co. of Canada, Ltd. A plant to be devoted exclusively to this end of the Canadian company's business is to be erected soon. It will be of such size that ultimately from 5000 to 10,000 men will be employed there. When the plant will be in operation nobody can fortell, but it is said that it will start about one year before the first tractors will be marketed.

Detroit Weatherproof Body Gets Plant

DETROIT, MICH., Sept. 13—The Detroit Weatherproof Body Co., recently organized to make weatherproof tops for Ford and other cars, will occupy the plant

formerly occupied by the Kemiweld Can Co. and which has been leased by the C. R. Wilson Body Co. with which the new concern is closely related. The plant is located at Clay Avenue and St. Aubin Street and contains about 80,000 sq. ft. of floorspace. A force of 400 to 500 men will be employed. The Wilson company has secured an option to purchase the plant at a price said to be about \$100,000.

Warner Mfg. Co. Gives Hour Cut

TOLEDO, OHIO, Sept. 9—During October the Warner Mfg. Co. will reduce its working week to a 48-hr. basis, or a 12-hr. cut. The present scale of wages will be continued. T. W. Warner, president, states that this action will be purely voluntary and that the move is experimental, its permanency depending wholly upon the men.

Tractor Uses Gas-Kerosene Carbureter-Electric Lighting

OSHKOSH, WIS., Sept. 11—A. J. and O. G. Patch, Oshkosh, Wis., for ten years associated with the Rumely and Fairbanks-Morse interests as tractor designers, are making exhaustive practical tests of a new gas-kerosene tractor they have developed at the Dauber-Kratsch machine shops in Oshkosh. Among the new features is a full electric lighting equipment, opening new possibilities in agriculture, such as night plowing and general haulage.

Hudson to Build on Newly Acquired Land

DETROIT, MICH., Sept. 13—The Hudson Motor Car Co. recently purchased a piece of land 500 by 380 ft. from the Anderson Forge & Machine Co. This property is located across from the present Hudson plant. A new engine-house and power plant will be erected on part of the land at once and later the construction of several large factory buildings similar to those of the present plant will be started.

Weed Assembling Plant in York

YORK, PA., Sept. 14—An assembling plant of the Weed Chain Co., Bridgeport, Conn., has been opened in this city in the plant of the York Engineering Co., North George Street and Hamilton Avenue. Employment is given to about sixty men. The automobile chains are manufactured by the Standard Chain Co., of this city, and instead of shipping them to Bridgeport, are assembled at the new factory. The plant will remain in operation here for at least six months. The same assembling plant was in operation last year.

to distribute a dividend of 38½ per cent among the creditors. The total available for this purpose and for the expenses of the receivership amounts to \$722,095. The court allowed \$67,500 to be paid the receivers as compensation, including counsel fees. Col. George Pope and C. A. Persons, two of the receivers, were discharged at their own request. The third receiver, C. A. Morse, has been retained to settle three disputed claims amounting to \$20,000.

Reo Pays Extra Dividend of 12½ Per Cent

LANSING, MICH., Sept. 8.—In addition to the regular quarterly dividend of 2½ per cent, the Reo Motor Car Co. will pay an extra cash dividend of 12½ per cent Oct. 1, to stockholders of record Sept. 30.

The stockholders of the Reo Motor Truck Co. will be paid a cash dividend of 10 per cent on the same date.

Regular Dividends

Rubber Goods Mfg. Co., New York City: Quarterly of 1¼ per cent on preferred, payable Sept. 15.

J. I. Case Co.: Quarterly preferred of 1¼ per cent, payable Oct. 1.

Gray & Davis, Boston, Mass., quarterly of 1¼ per cent on preferred, payable Oct. 1.

500 Scripps-Booths for Paris

NEW YORK CITY, Sept. 14—Peters & Sons, Ltd., Paris, France, have placed an order for 500 Scripps-Booth cars.

Securities Market Strong

Kelly-Springfield Features Market—Goodyear Also Makes High Mark

NEW YORK CITY, Sept. 13—Tire issues last week featured the market with many notable gains. The heaviest gain occurred on Friday when Kelly-Springfield second preferred rose fifteen points and that of the common rose nine points. Goodyear common followed closely behind with a gain of fourteen points. The rest of the tire issues showed small losses. Among the specialties General Motors made a high record on Saturday when it rose fourteen points above last week's rating. Peerless common's closing bid was 127, seven points above last week. The rest of the stocks were irregular, although the tone of speculation in the main was weaker. However, the weakness was prominent in the specialties, some of which suffered losses. The market was active and the dealings were fairly well diversified.

Detroit Quotations Weak

Although General Motors common was the feature of the Detroit markets with a gain of nineteen points and the preferred with a gain of two and one-half points, there was very little trading. Studebaker common closed at 114, a total gain of five and one-half points, while its preferred rose one and one-half points. The rest of the active

stocks closed with small losses, ranging from one-half to three and one-quarter points. The inactive stocks were irregular, no gains taking place. There were two losses, Atlas Drop Forge dropping two and one-half points and the W. K. Prudden stock one-quarter point. There was no trading in the bond market.

Gilbert Gibney Tire Vice-President and Sales Director

CONSHOHOCKEN, PA., Sept. 10.—J. M. Gilbert was elected vice-president and director of sales of the Gibney Tire and Rubber Co., this city, at a special stockholders' meeting of the company held in Philadelphia, Sept. 7.

Mr. Gilbert, who takes over a substantial stock interest, will direct the entire sales of the company, under the advisory guide of President J. L. Gibney. His offices will be in New York City, where the whole Gibney sales organization will have its center.

Duck with United Truck

NEW YORK CITY, Sept. 13—George H. Duck, former president of the Motor Truck Club of America, Inc., and for about a year with the Sewell Cushion Wheel Co., Detroit, Mich., has just been appointed general sales manager of the United Motor Truck Co., Grand Rapids, Mich. Mr. Duck will establish his headquarters at the United plant in Grand Rapids. Before joining the Sewell organization, he was the manager of the motor truck department of the New York City branch of the Locomobile Co. of America, Bridgeport, Conn.

Automobile Securities Quotations on the New York and Detroit Exchanges

	1914		1915		Wk's Ch'ge
	Bid	Asked	Bid	Asked	
Ajax-Grieb Rubber Co. com.....	300	..	..	..	..
Ajax-Grieb Rubber Co. pfd.....	101	..	..	..	..
Aluminum Castings pfd.....	102	..	..	..	..
J. I. Case pfd.....	75	81	..	..	+3
Chalmers Motor Company com.....	105	..	..	..	+10
Chalmers Motor Company pfd.....	95	100	..	..	..
Electric Storage Battery Co.....	70	74	..	..	-5
Firestone Tire & Rubber Co. com.....	530	535	..	..	..
Firestone Tire & Rubber Co. pfd.....	111	..	..	..	..
General Motors Co. com.....	255	256	..	..	+14
General Motors Co. pfd.....	113	115	..	..	+1
B. F. Goodrich Co. com.....	61	63	..	..	¼
B. F. Goodrich Co. pfd.....	106	108	..	..	-1
Goodyear Tire & Rubber Co. com.....	284	288	..	..	+14
Goodyear Tire & Rubber Co. pfd.....	108½	109½	..	..	½
Gray & Davis, Inc., pfd.....	..	..	..	..	..
International Motor Co. com.....	27	30	..	..	-3
International Motor Co. pfd.....	56	58	..	..	-4
Kelly-Springfield Tire Co. com.....	204	206½	..	..	+9
Kelly-Springfield Tire Co. 1st pfd.....	89	91	..	..	+3
Kelly-Springfield Tire Co. 2d pfd.....	200	210	..	..	+15
Paige-Detroit Motor Car.....	..	450	..	..	..
Maxwell Motor Co. com.....	42	43	..	..	-1
Maxwell Motor Co. 1st pfd.....	86	87	..	..	-4
Maxwell Motor Co. 2d pfd.....	36	38	..	..	¼
Miller Rubber Co. com.....	190	194	..	..	..
Miller Rubber Co. pfd.....	107½	..	..	..	..
New Departure Mfg. Co. com.....	153	155	..	..	..
New Departure Mfg. Co. pfd.....	107	..	..	..	..
Packard Motor Car Co. com.....	120	130	..	..	..
Packard Motor Car Co. pfd.....	100	..	..	..	-1½
Peerless Motor Car Co. com.....	127	140	..	..	+7
Peerless Motor Car Co. pfd.....	93	94	..	..	+3
Regal Motor Car Co. pfd.....	..	21	..	..	..
Portage Rubber Co. com.....	46	48	..	..	..
Portage Rubber Co. pfd.....	93	94	..	..	..
*Reo Motor Truck Co. com.....	17½	17¾	..	..	½
*Reo Motor Truck Co. pfd.....	32	33½	..	..	½
Splittorf Electric Co. pfd.....	..	..	..	..	..
Stewart-Warner Speed. Corp. com.....	65	66	..	..	+1
Stewart-Warner Speed. Corp. pfd.....	105	107	..	..	..
Studebaker Corporation com.....	114	116	..	..	+3
Studebaker Corporation pfd.....	..	..	..	..	..
Studebaker Corporation pfd.....	105	106	..	..	+1
Swinehart Tire & Rubber Co.....	88	90	..	..	..
Texas Company.....	150	154	..	..	+1
U. S. Rubber Co. com.....	48¾	50	..	..	¼
U. S. Rubber Co. 1st pfd.....	103¾	105	..	..	½
Vacuum Oil Co.....	228	232	..	..	-2
White Co. pfd.....	110	..	..	..	..
Willys-Overland Co. com.....	187	189	..	..	+5
Willys-Overland Co. pfd.....	107½	108	..	..	..

No quotations available on account of the war.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	1914 Bid	1914 Asked	1915 Bid	1915 Asked	Wk's Ch'ge
Chalmers Motor Co. com.....	..	98	103	..	+4
Chalmers Motor Co. pfd.....	..	..	95	97	..
Continental Motor Co. com.....	155	180	..	300	..
Continental Motor Co. pfd.....	..	75	84	..	..
General Motors Co. com.....	..	..	259	263	+19
General Motors Co. pfd.....	..	..	114	116	+2½
Maxwell Motor Co. com.....	9¾	11½	42	44	-1
Maxwell Motor Co. 1st pfd.....	29	31	86	89	-3¼
Maxwell Motor Co. 2d pfd.....	..	..	36	39	¾
Packard Motor Car Co. com.....	..	..	120	130	..
Packard Motor Car Co. pfd.....	92	..	100	101	..
Paige-Detroit Motor Car Co.....	..	..	..	450	..
*Reo Motor Car Co.....	20½	..	33	33¾	¼
*Reo Motor Truck Co.....	..	11½	16¾	17½	½
Studebaker Corporation com.....	..	..	114	116	+5½
Studebaker Corporation pfd.....	..	..	104	107	+1½

INACTIVE STOCKS

	1914 Bid	1914 Asked	1915 Bid	1915 Asked	Wk's Ch'ge
*Atlas Drop Forge Co.....	21	..	29	31	-2½
Ford Motor Co. of Canada.....	..	500	..	1525	..
Kelsey Wheel Co.....	..	..	205	..	..
*W. K. Prudden Co.....	..	20½	20½	22	¼
Regal Motor Car Co. pfd.....	25	..	..	21	..

BONDS

General Motors. notes, 6s, 1915.....	100	..	..	..	..
Packard Motor Co., notes, 5s, 1916.....	..	99	..	..	..

*Par value \$10; all others \$100 par value.

21 Entries for Narragansett

Will Hold Elimination Trials
—100-Mile Race Scheduled
—\$11,000 in Prizes

PROVIDENCE, R. I., Sept. 13.—To date twenty-one drivers have officially entered for the opening races on the 1-mile asphalt speedway at Narragansett Park, Saturday, Sept. 18. Both Babcock and Walter are endeavoring to make post entries with Peugeots. As only fourteen cars can start, it will be necessary to hold elimination trials.

There are three events, namely: 1-hr. motorcycle race; 25-mile automobile free-for-all and a 100-mile for cars for 450 cu. in. displacement. The prizes amount to \$11,000. Frank Lowry is starter.

DRIVER	CAR
De Palma	Stutz
Rickenbacher	Maxwell
Burman	Peugeot
G. Bergdoll	Erwin Special
E. Bergdoll	Erwin Special
Vail	Mulford Special
Haupt	Duesenberg
O'Donnell	Duesenberg
Henderson	Duesenberg
Dickinson	Stutz
Alley	Ogren Special
Jessop	Chevrolet
Sartori	Mercedes
Connerly	National
Myers	National
Sorresco	Stutz
Lecain	Pugh Bros. Special
Grant	Sunbeam
C. Basle	Bugatti
Jones	Peugeot
Mulford	Peugeot

Denver Run Is Called Off

DENVER, COL., Sept. 11—After being postponed twice on account of recent obstacles, the 860-mile economy and reliability run scheduled to start from Denver through the Colorado Rockies Sept. 6, was finally called off last night. The starting date was first changed to the 7th on account of Labor Day events, and then to the 12th on account of delayed entries. Now the difficulty on part of nearly all the dealers to get cars from the factories is continuing to such an extent that Charles F. Roehrig, promoter of the tour, believes it best to postpone the run until next season.

Golden Rule Traffic Booklet

CHICAGO, ILL., Sept. 13—Called the Golden Rule Traffic Booklet by the superintendent of the Chicago police department, a small folder entitled, Some Traffic Suggestions, published by the Chicago Section of the Electric Vehicle Assn. of America, earns its appellation because it admonishes motor vehicle drivers to show a little more consideration for the other fellow. It also points out that it seemed to be the disposition of drivers of electric vehicles to cling to the crown of the road whether going slow or fast, thereby impeding traffic, due to the idea that it is necessary to

keep an electric vehicle on the level to prevent acid in the battery cells from spilling.

It further points out that there is no danger from that condition when driving on the very slight incline found at the side of any Chicago streets and that the obvious course of a slow-moving electric should be along the curb, leaving the center to those who wish to drive at a higher speed.

Corona 300-Mile Race Is Postponed Until Christmas

CORONA, CAL., Sept. 8—The Corona 300-mile road race, scheduled for Nov. 20, will not be held on that date, but very probably on Christmas Day.

The three main roads into Corona will be under reconstruction on Nov. 20 and also there is to be a 150-mile track race at Phoenix, Ariz., on that date, which the Corona boosters did not want to conflict with. Members of the racing committee which is to handle the Corona classic this year waited upon the members of the Corona Board of Trustees yesterday and were informed that that body would grant a permit for the race if enough stars of the racing game were gathered together to make the race a big league attraction; but it was positively stated that the roads would be in no condition for a great race on Nov. 20.

Contracts Out for K. C. Speedway

KANSAS CITY, MO., Sept. 10—Contracts are now being signed for the building of an automobile speedway at Overland Park, on the Strang Electric Interurban near Kansas City. The Mid-Continent Exposition Club, which was organized several months ago for the purpose of building clubhouses and exposition quarters at Overland, has confined its enterprise solely to the speedway for the present. Dates will be scheduled for June, and fall dates will be secured. The speedway will be ready by the last of May, 1916. Wm. Huttig, president of the National Reserve Bank; W. B. Strang, of the Interurban line, and Frank Ufer, wealthy oil man, are the leaders in the speedway project.

New Traffic Rule in Boston

BOSTON, MASS., Sept. 13—Boston motorists are now faced with another problem, that of stopping machines every time a street car stops. The Board of Street Commissioners got a notion that it would be a good thing to have an additional traffic regulation added to its rules and so it evolved one that says that every motor car approaching a street car that has stopped to take on or let off passengers must come to a stop.

Resta to Try for Record

Sheepshead Opening Will Mark Attempt at Own 10-Mile Mark of 5:45

NEW YORK CITY, Sept. 15—The formal opening of the Sheepshead Bay Speedway, which takes place Sept. 18, will mark an attempt by Resta in a Peugeot at his own 10-mile record of 5:45, an average of 104.35 m.p.h., made at Chicago on Aug. 12, 1915, in the challenge race which he won.

Resta's trial will come as the climax to the formal opening of practice on the speedway. Prior to the practice there will be an automobile parade starting from Columbus Circle and proceeding to the speedway.

Mercer Stars at Wilmington Fair

WILMINGTON, DEL., Sept. 10—The four automobile events staged on the dirt track at Wilmington, in connection with the Delaware State Fair, to-night, gave the laurels in each case to Roy Freck, who drove a Mercer. Other events were canceled owing to a serious accident to R. O. Bacon, whose Renault threw a tire and overturned in the 3-mile event. The summaries:

First event—One mile: Won by Roy Freck, Mercer; second, W. Craig Regal; third, J. Whitaker, Detamble. Time, 1.15.
Second event—Trials, one mile: Won by Freck; second, Kuser, Renault. Time, 1.24 2-5.

Third event—Five miles, free-for-all: Won by Freck; second, Whitaker. Time, 8.52.
Fourth event—Pursuit race: Won by Freck. Time, 10.9 1-5. Time limit here was 15 min.

Brookmire Elected Treasurer of Pierce Oil Corp.

ST. LOUIS, MO., Sept. 11—Announcement was made here to-day that James H. Brookmire of this city has been elected treasurer of the Pierce Oil Corp. to succeed D. G. Boissevain of New York City. Mr. Brookmire will close his connections with a local brokerage firm of which he is a member as soon as possible and will establish an office under his new title in St. Louis.

Though not a member of the Board of Directors, he will be on the Operating Committee and will have virtual charge of the financial affairs of an oil corporation second in magnitude only to the Standard Oil Co. Mr. Brookmire has had the offer under advisement for two months and accepted the post during a recent visit to New York.

Federal Owners' Contest Closed

DETROIT, MICH., Sept. 13—The contest started some months ago by the Federal Motor Truck Co. of this city among the owners of Federal trucks for the fifteen

best answers to the question, Why I Bought a Federal has been brought to a close and the cash prizes of \$300 paid, although the names of the winners have not as yet been announced. The requirements of a motor truck from the user's standpoint as brought out in the hundreds of answers received were as follows: Simplicity in design; economy, not cheapness, in initial price; economy in upkeep and repairs; the reputation of the truck in all lines of work and the stability of the truck manufacturing concern.

In addition to the \$300 awarded in cash prizes, every owner who entered the contest was present with a gold-plated Federal watch chain.

Milwaukee Independent Issue Price Classifications

MILWAUKEE, WIS., Sept. 10—Independent gasoline marketers in Milwaukee have taken cognizance of the necessity for new price classifications to accommodate large consumers as against motorists getting small supplies at filling stations for practically the same prices. Filling stations dot the city. While the new classification does not increase the price to the small consumer, the large consumer is benefited by a decided reduction. The new classification and quotations now prevailing are:

Grav-ity	Filling Station, Any Quantity	Tank Wagon Delivery	Tank Wagon Delivery, 100 Gal. or More
60.....	10.5c	9.6c	8.6c
65.....	14.0c	13.5c	12.5c
70.....	16.0c	15.5c	14.5c
72.....	18.0c	17.5c	16.5c

Ford System Denounced at Milwaukee Convention

MILWAUKEE, WIS., Sept. 12—The Ford Motor Co.'s \$5-a-day minimum wage plan was denounced at the third biennial convention of the International Wagon, Carriage and Automobile Workers' Union, held in Milwaukee, Sept. 7-11.

The convention went on record as opposing the piecework system and in favor of a strict 8-hr. day. The rule in the trades represented by the union is piecework and a 10-hr. day.

Rumely Changes Name

LA PORTE, IND., Sept. 8.—Advance Rumely Co. is the name selected by the Rumely corporation for use under the reorganization according to an announcement.

N. A. C. C. to Issue Handbook

NEW YORK CITY, Sept. 14—The annual hand book of the products of the ninety-seven companies holding membership in the National Automobile Chamber of Commerce, Inc., to cover the 1916 models will be issued at show time.

2-Mile Speedway for New Orleans

300 Acres 4 Miles from City Secured — \$300,000 Board Track

CHICAGO, ILL., Sept. 14—New Orleans, La., is assured of a 2-mile board track and an option has been closed on 300 acres of land four miles from the heart of the city.

It is estimated that the plant will cost \$300,000. The low cost is possible because wood native to Louisiana will be used. The track will be built of cypress and the stands and other buildings of yellow pine. The three men most interested in the project are R. Brennon, prominently identified with New Orleans horse racing; George Sarpy, a New Orleans insurance man; and C. J. Dunbar, a wealthy timber owner of Vancouver, B. C.

They probably will finance the undertaking. They have asked D. B. Reid, president, of the Chicago Speedway, to take the presidency of the Association and direct the construction of the plant.

Olds Supplies Cold Weather Combination Top

LANSING, MICH., Sept. 11—As a substitute for the conventional winter limousine the Olds Motor Works are supplying dealers with a cold weather top which is so constructed that in the summer the side sills and windows can be removed, thus leaving the sides entirely open. The standard windshield remains in its place and serves as a rigid front support for the top. A glass shield is mounted on the front of the top above the windshield in such a way that it prevents the windshield from becoming coated with snow.

Chalmers Employees Are Entertained by Humphrey

DETROIT, MICH., Sept. 11—Between 120 and 130 heads of departments, their assistants, foremen and others all employed by the Chalmers Motor Co. were entertained at a get-together dinner and entertainment at the Hotel Tuller, to-night, by S. H. Humphrey, vice-president and works manager of the Chalmers company.

Denver Garage Bill Passed

DENVER, COL., Sept. 10—The bill requiring garages to pay a yearly license fee of \$25 was passed at this week's meeting of the city council. There was no opposition from the garagemen after the Automobile Trades Association succeeded in having the amount of the fee reduced from \$50 to \$25. The new ordi-

nance will affect sixty or more public garages.

A companion measure to permit garages to install curb pumps within certain districts by paying a license fee of \$25 a year for each pump, was brought up for consideration but was referred to the city attorney for further advice. The bill is expected to pass.

To Build Combination Air Compressor and Starter

BALTIMORE, MD., Sept. 11—A combination air compressor and starter has been invented in the shop of the Auto Air Appliance Co., Industrial Building, this city, by C. G. Eidson and Thomas Davis. The inventors say it has been tested thoroughly and is successful. It is to be put on the market later.

The compressor and starter are cast in one piece and a chain connects the clutch of the compressor with the crankshaft of the automobile. Upon pressing a small button the compressed air is released and starts the chain turning. This, in turn, starts the engine of the car. The air also can be used for pumping up the tires.

When 250 lb. pressure is reached a governor valve prevents the further compressure of air. When the pressure gets below 200 lb. the valve again regulates the compressure. The device is about 17 in. long and 9 in. high.

Packard Grants Bonus to Employees in Military Service

DETROIT, MICH., Sept. 9—At a meeting of the board of directors of the Packard Motor Car Co. a resolution was passed to the effect that any one of the 9300 Packard employees shall be granted leave of absence at any time he is eligible to take part in any military instruction, national guard encampment or national reserve cruise. It was further provided that during the time of his absence the employee shall also be credited with his full pay and that the time for military instruction shall not be deducted from his regular vacation period.

Lockout of Rutenber Founders

INDIANAPOLIS, IND., Sept. 11 —Hurry-up arrangements have been made by the Rutenber Motor Co., Marion, Ind. for Indianapolis foundries, including the American Foundry Co. to produce castings for Rutenber motors. At the Logansport, Ind., foundry of the Rutenber company, labor troubles have paralyzed the plant. Owing to disputes over piecework rates followed by a lockout of 200 coremakers and molders, the Logansport plant, which is devoted to castings entirely, had to be shut down. To keep the Marion machine, forging and assembly shops busy, outside help has been enlisted to supply castings.

Over 125,000 at Hoosier Fall Show

25 Per Cent of State Fair Visitors Attended Because of Car Exhibit

INDIANAPOLIS, IND., Sept. 14.—The automobile show which closed here Saturday and which was held under the auspices of the Indianapolis Automobile Trade Association in connection with the State Fair, was the most successful of any automobile show or exhibit ever held in Indianapolis. Although no admission was charged, therefore, no system could be obtained that would give an actual check on the attendance, it was estimated that over 125,000 visitors attended the show, and that fully 25 per cent of the State Fair visitors attended particularly on account of the automobile display. That this year's attendance at the State Fair exceeded all previous years is directly attributed to the credit of the automobile show, according to State Fair officials.

Never before have so many State Fair visitors driven to Indianapolis in automobiles. This was evidenced by the large number of out-of-town cars seen on the streets each night.

Want Exhibit Building

Officials of the trade association believe that if an exhibit like the one just closed can be given with such tremendous success in a tent, that it is fair to assume that even better records can be made if the State Fair Association would provide a pavilion or building suitable and in keeping with the high character of an automobile display.

The value of the automobile exhibit totaled more than \$130,000, and such a display, it has been argued, is entitled to a better setting than a canvas enclosure. Practically all the dealers in Indianapolis exhibited at the Fair, thus the show was a decided benefit to automobile buyers. It gave them an opportunity to see all the new cars—to compare values—to learn of the improvements that manufacturers have been making during the present year. Much business was done at the show both in the complete car and the accessory line.

Twenty-Three Makes of Cars at Toledo Fair

TOLEDO, OHIO, Sept. 10.—One of the features of the annual Lucas County Fair, held at Toledo the week of Sept. 6 was the display of both pleasure and commercial motor vehicles. The number of cars displayed was large and many of the makes were represented. The cars were displayed under a tent. The dealers taking part in the display were:

Blevens Auto Sales Co., Studebaker; Cornelius-Browning Auto Co., Chalmers and Inter-State; Atwood Automobile Co., Overland; Abbott Motor Sales Co., Abbott and Allen; Roberts-Toledo Automobile Co., Ford; Lichtie Auto Co., Chandler; Paige-Toledo Co., Paige; Landman-Griffith Co., Maxwell; Gamble Motor Car Co., Hudson and Dort; Toledo-Saxon Co., Saxon; Bunnell Auto Sales Co., Chevrolet and Kissel; H. W. Lancashire, Dodge; United Garage Co., Reo; Auto Distributing Co., Regal; King Motor Sales Co., King; Elon Gauntlett, Buick; H. E. Throne, Mitchell; G. E. Grant Auto Sales Co., Oldsmobile and Argo.

Eighteen Cars Exhibited at Worcester Show

WORCESTER, MASS., Sept. 11.—One of the most successful open air shows ever held in New England ended here when the New England fair closed this week. The exhibition was very well patronized, and it was a much better show than had ever been put on here, there being about forty-five vehicles displayed.

Those who exhibited comprised J. W. Sargent, Maxwell; Henshaw Motor Co., Dodge; O. P. Tyler, Stanley; Paige Motor Car Co., Paige-Detroit and Saxon; Harry J. Murch, Cadillac; Henley-Kimball Co., Hudson; F. S. Howard Motor Car Co., Chevrolet and Mitchell; F. H. Kenney, Chalmers; Harry Boland, Hupmobile; Metz Motor Car Co., Metz; Green & Hale, Jackson and Oakland; J. F. Brosnahan, Chandler; Thorvald Hanson, Cole; J. C. Harvey, Haynes; New England Truck Co., Netco truck.

Louisville Trade Association Formed

LOUISVILLE, KY., Sept. 9.—Articles of incorporation have been filed in the office of the Jefferson county clerk by the Automobile Trade Association. The object of the association is to bring together in social intercourse the members of the trade in Louisville, to promote betterment of trade conditions, the introduction of new methods in business, the correction of abuses and the conservation of the automobile trade. The corporation has no capital stock and is not authorized to incur any indebtedness, but is authorized to create a fund from membership fees. The incorporators and officers are: W. A. Thomas, president; R. E. Warner, vice-president; A. F. Wolke, secretary, and J. W. G. Hughes, treasurer.

Error in Hollier Advertisement

NEW YORK CITY, Sept. 13.—In THE AUTOMOBILE for Sept. 9 appeared an advertisement of the Hollier eight made by the Lewis Spring & Axle Co., Detroit, Mich., which stated that the size of the motor is 3 by 3¼ in. This should have

been 3 by 4¼ in. In a description of the Hollier eight roadster it was stated that the size of the tires was 33 by 3½ in. This should have been 32 by 3½ in.

Daly and Beyerline Form Co.—To Act as Agents

DETROIT, MICH., Sept. 13.—The firm of Daly & Co. has been formed by W. L. Daly and J. G. Beyerline, with headquarters in the Hammond building to act as manufacturers and distributors' agents, also as special automobile advisors on commercial matters. Mr. Beyerline has been in the automobile business for the past thirteen years, being president and general manager of the King Motor Car Co. during the last three years. Mr. Daly was sales manager of the King company.

Export House Appoints New Heads of Far Eastern Division

NEW YORK CITY, Sept. 10.—Gaston, Williams & Wigmore, New York City, doing a large export business in automobiles and trucks, announces that its Far Eastern Division, organized and equipped to develop markets for America's industries, will hereafter be in charge of J. J. Keegan and H. J. Rosencrantz as its managing directors. These two men have been prominently identified with American trade development in that section of the world for the past sixteen years, representing American manufacturers.

F. J. Rown of Racine, Wis., former State manager of the Mitchell-Lewis Co. for Texas, also eastern district manager for the American Motor Car Co., sailed on the New York, Aug. 11 for Liverpool, to represent Gaston, Williams & Wigmore as managing director for their automobile department in the British Isles. His address will be Alexandria House, London.

Five Electric Vehicles at Show

NEW YORK CITY, Sept. 13.—Five electric vehicle manufacturers, of which three are makers of commercial models, will exhibit at the Electrical Exposition and Motor Show to be held at the Grand Central Palace here Oct. 6 to 16 and several makers of electric vehicle parts and accessories.

The U. S. Army will also exhibit field radio sets and one of its wireless telegraph gasoline tractors. Electric vehicle exhibitors so far allotted space follow:

Anderson Electric Car Co., General Vehicle Co., Baker-R. & L. Co., Ward Motor Vehicle Co. Accessory makers are: Philadelphia Storage Battery Co., Edison Storage Battery Co., Electric Storage Battery Co., Cooper Hewitt Electric Co., Westinghouse Electric & Mfg. Co., General Electric Co. and H. W. Johns-Manville Co.

Factory Miscellany

Waukesha Motor Adding—The Waukesha Motor Co., Waukesha, Wis., is adding. The former building will be remodeled for a machine shop.

Piston Ring Co. to Build—The Piston Ring Co., Muskegon Heights, Mich., has purchased adjoining property and will build an addition to its plant.

Foster Gear to Add—The Foster Gear Co., manufacturer of automobile steering gears, will build an addition to its plant on Kaiser Street, Columbus, Ohio.

Twin City Truck's Large Addition—The Twin City Four-Wheel Drive Co., Minneapolis, Minn., is having plans prepared for a plant to cost about \$500,000.

Michigan Crown Fender in Ypsilanti—The Michigan Crown Fender Co., maker of automobile fenders and metal stampings, is to locate at Ypsilanti, Mich., and will occupy a building 80 by 400 ft., to be erected for it.

Steerautomat Co. Doubles Capacity—The Steerautomat Co., Beloit, Wis., manufacturing auxiliary steering devices for Ford cars, is doubling the capacity of its shop established several months ago.

To Make Dimmers—The Shade-O-Lite Co., Indianapolis, has been incorporated with \$25,000 capital stock to manufacture automobile searchlight dimming devices. The directors are F. W. Beauchamp, C. H. Thompson and R. F. Davidson.

To Make Fenders—The Clayton & Lambert Mfg. Co., Detroit, Mich., maker of plumbers' firepots, torches, etc., has

added to its business a department for the production of automobile fenders, drip-pans and other stamped sheet metal work.

To Make License Tags—The Abbott Stamping Co., Detroit, has been organized by C. S. Abbott, B. B. Bennett and F. B. Borlean to manufacture automobile license tags. The new company has acquired a factory and has installed modern stamping and enameling equipment.

To Make Carbureters—The factory building at 314-316 East Water Street, Milwaukee, has been purchased by W. G. and E. R. Spence, officials of the Rundlespence Mfg. Co., Milwaukee, who recently incorporated the Turbo Motor Devices Co., to manufacture carbureters and other devices for internal combustion engines. The building will be remodeled for use at once.

Hayes Takes Over St. Johns Plant—The old plant of the St. Johns Table Co., St. Johns, Mich., has been taken over by the Hayes Wheel Co., Jackson, Mich., which is now installing machinery. Truck wheels will be made and from fifty to seventy-five men will be employed. H. J. Keller, formerly superintendent of the Auto Wheel Co., Lansing, is with the company in a similar position.

Hudson-Stuyvesant to Lease—The Hudson-Stuyvesant Motor Co., Frank Stuyvesant, president, 1914 Euclid Avenue, has increased its capital stock from \$25,000 to \$50,000 preparatory to taking a lease on two buildings to be erected at

2002 Euclid Avenue, Cleveland. The buildings will be three-story, brick and steel, 45 by 100 ft., and one-story, 45 by 89 ft., brick and steel. They will cost about \$50,000.

Falls Making Plant Changes—The Falls Machine Co., Sheboygan Falls, Wis., manufacturing internal combustion engines and specializing in automobile motors, is making radical changes in its plant in addition to building a new assembling shop. The gray-iron foundry is being dismantled and converted into a machine shop. The company has taken contracts for delivering 12,000 engines by May 1 and as soon as changes and additions are completed, a night shift will be put on.

Milwaukee Die Casting Builds—The Milwaukee Die Casting Co., Home Building, Milwaukee, will soon take occupancy of permanent quarters of its own. A two-story brick factory and foundry is being erected for the concern on Fourth Street. It will be 60 by 60 ft. in size and equipped with the latest furnaces, molding machines and other up-to-date equipment. While the company is a large producer of die castings in aluminum, bronze, copper, brass and other metals, it devotes considerable attention to babbitt bearings for internal combustion engines.

Moon Australian Agent Visits Factory—George Duffy, agent for the Moon in Sidney, Australia, is spending a few weeks in the Moon factory in St. Louis.

The Automobile Calendar

Sept. 13-17.....Milwaukee, Wis., Show, Automobile Dealers' Assn.	Oct. 1-2.....Trenton, N. J., Track Races; Inter-State Fair.	Oct. 16.....Chicago, Ill., 350-Mile Race, Chicago Speedway.
Sept. 13-17.....Oakland, Cal., Pan-American Road Congress.	Oct. 2.....New York City, Sheephead Bay Motor Speedway 350-Mile Race.	Oct. 17.....Twin City Speedway Match Race.
Sept. 17-18.....Peoria, Ill., Illinois Garage Owners' Assn. Convention.	Oct. 2.....Fresno, Cal., 150-Mile Race, District Fair, Fresno County Agricultural Assn., C. G. Eberhard.	Oct. 18-19.....Cleveland, O., Hotel Statler, Sixth Annual Convention, Electric Vehicle Assn. of America.
Sept. 18.....Providence, R. I., 100-Mile Race, Narragansett Park Speedway, Inc.	Oct. 2-9.....Cincinnati, Ohio, Show, Music Hall, Cincinnati Automobile Dealers' Assn.	Oct. 18-24.....Troy, N. Y., Show, State Armory, Troy Automobile Dealer's Assn.
Sept. 18-25.....Los Angeles, Cal., Show, Shrine Auditorium.	Oct. 4-10.....St. Louis, Mo., Show, Forest Park Highlands, St. Louis Automobile Manufacturers and Dealers' Assn.	Nov. 1-3.....Pasadena, Cal., Show, Hotel Green, Walter Hempel.
Sept. 20-25.....San Francisco, Cal., International Engineering Congress.	Oct. 4, 5, 6.....Columbus, O., Garage Owners Convention.	Nov. 18.....Arizona 150-mile Grand Prix.
Sept. 22.....New York City, Booster's Outing to Smithtown.	Oct. 6-16.....New York City, Ninth Electrical Exposition and Motor Show at Grand Central Palace.	Nov. 29-Dec. 4.....Electric Prosperity Week.
Sept. 22-25.....Rockford, Ill., Show.	Oct. 9.....Indianapolis, Ind., 100-Mile Invitation Race, Motor Speedway.	Dec. 31.....New York City, Show; Grand Central Palace.
Sept. 24.....Indianapolis, Ind., S. A. E. First Section Meeting.	Oct. 11-12.....Dayton, O., National Paving Brick Manufacturers' Assn., Annual Meeting.	Jan. 8-15.....Philadelphia, Pa., Philadelphia Auto. Trade Assn.
Sept. 26-Oct. 10.....Denver, Col., Show, International Soil Products Exposition, Automobile Trades Assn. of Colorado.	Oct. 14.....Chicago, S. A. E. Standards Committee Meeting.	Jan. 22, 1916.....Chicago, Ill., Show; Coliseum.
Sept. 27-Oct. 2.....Salem, Ore., Show, State Fair.		Jan. 24-29.....Buffalo, N. Y., Show, Buffalo Automobile Dealers' Assn., Broadway Auditorium.
Oct.....Dallas, Tex., Show, Dallas Automobile Dealers' Assn.		Jan. 29-Feb.....Minneapolis, Minn., Show, National Guard Armory, Minneapolis Trade Assn.
Oct.....Los Angeles, Cal., Broadway Automobile and Flower Show, Automobile Dealers' Assn.		Feb. 19.....Newark, N. J., Show.
		March 4-11.....Boston, Mass., Truck Show, Mechanics Bldg.

New Beech Creek Plant—Beech Creek Auto Co., Beech Creek, Pa., G. H. Tibbons, secretary, has plans for a \$25,000, two-story, automobile factory.

Mohawk Starts Third Annex—Before the masonry of the second addition this year to the plant of the Mohawk Rubber Co., Akron, Ohio, is scarcely above the ground, work has been started on a third annex.

Apperson Starts Addition—It is announced by the Apperson Bros. Automobile Co., Kokomo, Ind., that work on an addition to one of its plants has been started. This will give the company an additional 150,000 ft. floorspace.

Purair Tire Pump Co. Moves—The Hert Mfg. Co., Indianapolis, Ind., maker of the Purair tire pump, has removed from 150 South Delaware Street to its new building, corner Noble & Market Streets, where additional equipment has been installed and production capacity largely increased.

Remy Entertains Employees—One thousand five hundred employees of the Remy Electric Co., their families and friends, a total of nearly 5000 persons, were entertained with a lawn party and dance at the factory of the Remy company at Anderson, Ind., Friday night of last week. There was a continuous procession of persons passing through the factory, which was open for inspection.

Perfection Tire Plant Progressing—The plant of the Perfection Tire & Rubber Co., Fort Madison, Iowa, is progressing. The steel workers are now erecting the skeleton of the main factories and some smaller buildings have been completed. The labor required when the factory is in operation will approximate one man per tire. The company recently received a contract with an Eastern concern for 1000 tires per day for 5 years.

Dunlap Receivership Lifted—The receivership of the Dunlap Manufacturing Co., located at 1432 Parsons Avenue, Columbus, Ohio, maker of automobile parts, has been lifted and a new concern has been organized to run the business. For the time being the attention of the company will be devoted to the manufacture of machine tools. F. B. Chapman is president; H. N. Rose, secretary, and T. C. Dunlap, general manager. Howard Park was receiver.

Wheel Plant for Anderson—Negotiations were practically closed Saturday for locating in Anderson, Ind., an automobile wheel factory by the Hayes Bros., Jackson, Mich., who also have a factory in Michigan. The Anderson plant will occupy a two-story building owned by the Pioneer Pole & Shaft Co. and it was stated that the new factory will employ from 800 to 1200 men. The output of the factory, it is said, will be

25,000 sets of automobile wheels per month.

Equipping Syracuse Differential Plant—The Brown-Lipe-Chapin Co. is equipping the Lipe Model Works in Syracuse, N. Y., with special machinery for making M. & S. differential gears exclusively. In addition to taking care of the demand from the manufacturer, this plant will be used also for making the M. & S. differential special type for Ford cars, though the Ford replacement sales will continue to be handled by the M. & S. Gear Co., 1036 David Whitney Bldg., Detroit.

Sterling Wheel Erects Plant—The Sterling Wheel Co., 245 Oregon Street, Milwaukee, which recently changed its corporate style from T. S. Wheel & Mfg. Co., is erecting a plant of its own at Eighth and Oklahoma Avenues, Milwaukee, to be ready about Sept. 15 or Oct. 1. The company operates a large machine shop, specializing in parts for motor car and engine builders, in addition to building the Sterling steel wheel, a flexible device employing solid tires and suitable for all grades of pleasure cars as well as trucks.

Johns-Manville Moves General Offices—The H. W. Johns-Manville Co., Milwaukee, Wis., has moved its general offices from Milwaukee to Chicago because of the large growth of its business in the Middle West, which requires administrative facilities such as Chicago only can afford. The company operates two large works in Milwaukee, and the change will not affect these operations. T. T. Lyman, general manager, goes to Chicago, and the Milwaukee plants will temporarily be in charge of President C. B. Manville.

American Metal Products Busy—The American Metal Products Co., Milwaukee, Wis., which recently announced a new product called Ampco bronze, claimed to have the strength of steel, with much less weight, is producing the new metal in large quantities for high-speed bearings, particularly motor car engines. The company has appointed 25 Milwaukee garages and service stations as agents and is making bearings for connecting rods, crankshafts, transmissions and wherever plain bearings are used for general repair work.

Empire in New Plant—In the new factory of the Empire Automobile Co., Indianapolis, Ind., now are centered the administration and manufacturing interests of the company, the general offices having been moved to the new plant during the past week. At present the six-cylinder model is being built in the local plant. The type made its first public appearance at the State Fair Auto Show during the past week. The new quarters in addition to giving excellent car building facilities afford

greatly enlarged accommodations for executive and sales offices.

To Build Electric Steel Plant—The demand from manufacturers of high-grade motor vehicles for electric steel and the growing use of this material in other lines has induced the Belle City Malleable Iron Co., Racine, Wis., to establish an electric steel plant in connection with its malleable foundries. Ground will be broken at once for a new foundry, 80 by 160 ft. in size and 30 ft. high, costing \$125,000 with equipment. One of the furnaces alone will cost \$25,000. The plant is to be ready by the end of the year and will employ 250 experts, giving the Belle City company a force of more than 600 workmen.

Rutenber's Four New Buildings—The Rutenber Motor Co., Marion, Ind., is just completing the construction of four new buildings at the main plant at Marion, which increases its floor space some 25,000 ft., this being about a 25 per cent increase of floor space over the original plant. It has added a large battery of automatic screw machines, multiple spindle drill presses, turret lathes, etc., to manufacture the smaller parts. The annual output has been increased from 12,000 to approximately 18,000 motors. The company has cancelled all European orders and has abandoned its London agency.

Firestone Makes Big Additions—Five additions to the factory of the Firestone Tire & Rubber Co. at Akron, Ohio, aggregating over 300,000 sq. ft., or 7 acres of floorspace, are at present well under way and will no doubt be completed before snow flies. These additions will be occupied by offices, tire-making machinery and by rooms for the many processes of the industry. Through these new additions the present output of 7500 tires daily will be increased to 12,000 per day, an increase of 60 per cent. Besides these extensive additions a commodious clubhouse for Firestone employees is being erected across the street from the factory. It will be ready for occupancy next spring.

New Steel Products Building—To accommodate an increase in production in its automobile springs department, the Detroit Steel Products Co., Detroit, Mich., will erect a new building, which will add approximately 15,000 sq. ft. to its present floor space. Work on the new building will start as soon as all the details of the plans are completed. This will be the third addition made to this department of the factory within a year. The building will conform in style to the type of the present buildings—sand-lime brick, concrete and steel construction with steel windows. The spring department has been rushed to capacity every month this year, three shifts of men having been employed even throughout the slack period a few months ago.

The Week in the Industry



Raynor with Herff-Brooks—R. B. Raynor has joined the Herff-Brooks Corp. to cover the Middle West, representing that company in Missouri, Illinois and Indiana.

Reason Adds Two Cars—George Reason, formerly manager of the local branch of the Cartercar Co. and who now operates the Reason Garage, 33 Charlotte Avenue, Detroit, Mich., has taken the agency for the Allen and Paterson cars.

P. E. Winslow Advanced—P. E. Winslow, who has been connected with the advertising department of the Hupp Motor Car Co. for the last eighteen months, has been appointed secretary to J. Walter Drake, president of the company.

Palmer Knight Tire Rep.—H. D. Palmer, formerly with the Globe Tire Co., Trenton, N. J., has been appointed district sales representative in New York State territory for the Knight Tire & Rubber Co. of New York, succeeding E. J. Coniff, resigned.

Moore Cleveland Mgr.—G. P. Moore, formerly prominently identified with the automobile industry in Pittsburgh, has been made manager of the Cleveland Motor Sales Co., 1628 Euclid Avenue, Cleveland, distributor for the Haynes and Hupmobile.

H. J. De Baer Has Assistant—M. C. Manship, who formerly made his headquarters at the Maxwell Motor Sales Corp. factory in Detroit, has been made assistant manager of the company's New York retail branch. He will assist H. J. De Baer, manager of the branch, in looking after local sales.

Lewis J. I. C. Mgr.—P. A. Lewis has been appointed manager of the Milwaukee branch of the J. I. Case T. M. Co., Racine, Wis. The branch, which devotes practically all of its attention to the sale of and service on Case cars, is located at 493 Broadway. Mr. Lewis was formerly associated with the Case branch at Madison, Wis.

Chase Takes Apperson—M. F. Chase, who has handled the Stutz in New England for some years until this season, has taken on the Apperson at retail and will market it from the former Stutz salesrooms on Boylston Street. This will not have any effect upon the selling of Appersons at wholesale in Boston by the Brown-Apperson Co.

Motor Men in New Roles

Stillson Portland Olds Mgr.—W. W. Stillson will manage the Oldsmobile Co. in Portland, Ore., with headquarters at 37-39 North Broadway.

de Catellane Sales Mgr.—A. de Catellane has been appointed sales manager of the Hainsworth Motor Co., Olds distributor at 1409-1413 Broadway, Seattle, Wash.

Coulson Baltimore Mgr.—A. D. Coulson will manage the recently formed Baltimore Buggy Top Co., Baltimore, Md., with quarters at 107 West Mount Royal Avenue.

Dant Heads Louisville Agency—G. W. Dant has been elected president of the Bywater-Ortner Motor Co., Louisville Studebaker dealer. N. W. Bywater is secretary.

Salman Hudson Export Rep.—The Hudson Motor Car Co., Detroit, Mich., is sending A. T. Salman as a special export representative to Australia, Asia and South Africa.

Aull Columbus Sales Mgr.—A. E. Aull has been appointed sales manager of the Central West Motor Car Co., Columbus, Ohio, handling the Oakland and Abbott-Detroit with offices at 80-82 Fourth Street. G. W. Carroll is general manager.

Sullivan Joins St. Louis Enger—J. J. Sullivan, formerly of the Enger agency in the Chicago district, has been assigned to the Ottogy Motor Car Co., St. Louis, and will assist that firm in establishing subdealers for the Enger line in the St. Louis district.

Hazzard Hall Switch Mgr.—Besides being president of the Falcon Motor Truck Co., Detroit, Mich., A. B. Hazzard has also been appointed general works manager of the Hall Switch & Signal Co., Garwood, N. J. He will have charge of the manufacturing of parts for the Falcon and other companies.

Foote Joins St. Louis Co.—E. B. Foote, formerly with the Westinghouse company, has been appointed territory sales manager of the Newell Motor Car Co., St. Louis, which has just added the product of the Sun Motor Car Co. to its line. Mr. Foote will make his headquarters at St. Louis and Memphis, Tenn.

Lindley Hardman Tire Branch Mgr.—H. P. Lindley, for four years a member of the Bart S. Adams Tire Co., St. Louis, has been appointed branch manager of

the Chicago office of the Hardman Tire & Rubber Co., Belleville. E. J. Lindley will have charge of the sales in ten States. He will retain his interest in the Adams company.

Jackson Joins Maxwell Agency—C. G. Jackson, former manager of the United States Motor Co., Maxwell distributor in the St. Louis district, and previously zone supervisor for the Maxwell company, has joined the sales force of the George C. Brinkman Motor Car Co., which recently was given the Maxwell agency in the Missouri district.

Cosgrove Pullman Sales Mgr.—A. R. Cosgrove has been appointed sales manager of the Pullman Motor Car Co., York, Pa. Mr. Cosgrove has had wide experience in the selling of automobiles and accessories and up until his connection with the Pullman company was sales manager of the magnetic gear shift department of the Cutler-Hammer Mfg. Co., Milwaukee, Wis.

Barthmaier Takes Agency—E. V. Barthmaier has resigned his position with O. S. Wilson, Studebaker dealer in Philadelphia, Pa., to take territory for the exclusive sale of that car at Norristown, Pa., and surrounding district. Temporary quarters have been established at 318 West Main Street during the construction of a salesroom and office building at Main and Chain Streets.

Clark Retires from Business—P. S. Clark, one of the veteran dealers at Providence, R. I., has retired from business and will devote his time to civil engineering and show matters. The Mitchell line that he has handled has gone to W. R. Richards, long associated with him as a salesman. Mr. Clark will have charge of the annual show of the Rhode Island Dealers' Assn., which takes place early in the winter.

Bull Assisting Crawford—A. A. Bull is an assistant to Charles S. Crawford, chief engineer of the Cole Motor Car Co., Indianapolis. Mr. Bull comes to the Cole company from the Northway Motor Manufacturing Co., Detroit, Mich. He had an extensive experience with the Hummer, Ltd., of Great Britain. He was associated with the English branch of the Daimler company, the builders of the Mercedes car. In America he saw service with the Oldsmobile company, Lansing, and later the Northway organization, in Detroit. Mr. Bull is a graduate of the Institute of Automobile Engineers of Great Britain.

Enger in Bucyrus—F. J. Norton & Sons, Bucyrus, O., has taken the agency for the Enger car.

Gaulois Tires in Ottawa—The Ottawa Taxi & Auto Co., Ltd., Ottawa, Ont., represents the Gaulois tire in that city.

Little Rock Buick Builds—The Buick Auto Co., Little Rock, Ark., will construct a two-story garage at 1118 Main Street.

Beltzig a Manager—E. H. Beltzig has been appointed manager of the St. Louis branch of the Firestone Tire & Rubber Co., Akron, Ohio.

New Supply Co. for Utica—The Wood Auto Supply Co., Utica, N. Y., has been incorporated with a capital of \$25,000, to deal in automobile accessories.

Smith in Charge—G. A. Smith has been appointed manager by the Ford Motor Co., of the service and repair departments of the Everyman's Car Co., Ottawa, Ont.

Gilmore Goes to New York—E. A. Gilmore, who had the Lewis and Allen cars in Boston for wholesale distribution in New England, has gone to New York to join the salesforce of the Carl H. Page Co.

Robinson in Charge—L. J. Robinson has been put in charge of the exchange department of the Union Garage Co., Chalmer agent in Washington, D. C. This department will act as a clearing house for used automobiles.

Knaus Portland Franklin Sales Mgr.—A. H. Knaus, who was southern California district sales manager of the Chalmers Motor Co., has become sales manager of the Braley Auto Co., Portland, Ore., handling Franklin cars.

Smith Joins Cleveland Co.—J. M. Smith, production expert, has joined the Cole-Cleveland Co., formerly the Richardson Motor Car Co., Cleveland, Ohio. He

will inaugurate the new coupon service system.

Roberts Joins Edison—H. M. Roberts, until recently railroad representative of the General Lead Battery Co., has been appointed sales engineer of the railroad department of the Edison Storage Battery Co., Orange, N. J. Mr. Roberts' headquarters will be at the factory and main office at Orange, N. J.

Larson Heads Spokane Agency—D. N. Larson will manage the recently formed Foster-Larson Co., Spokane, Wash. This distributor will handle the Paige car. Newton Foster will continue to manage the Newton Foster Co., Seattle Paige distributor. Salesrooms and service station have been opened at 1218 Second Avenue, Spokane.

Wright Goes to Woods Electric—T. E. Wright, formerly in charge of agencies in extensive Western territory for the Anderson Electric Car Co., has accepted a position as special representative with the Woods Motor Vehicle Co. In his new work Mr. Wright will superintend the work of distributors for the Woods Electric in southern Illinois, Indiana and Ohio.

Williams Gets Detroit Studebaker—R. H. Williams, manager of the Indianapolis, Ind., branch of the Studebaker Corp. since January, has been appointed to the managership of the Studebaker branch at Detroit, controlling the entire State of Michigan and the Detroit retail branch. He is succeeded here by L. A. Tilley, special representative for the Studebaker corporation.

Semmes Heads Washington Co.—The Semmes Motor Co., Washington, D. C., has been formed by the amalgamation of the Congressional Garage Co., Semmes-Kneessi Co. and the Semmes Motor Line. The officers are: C. W. Semmes, president; H. G. Kneessi, first vice-president

and treasurer, and Raphael Semmes, vice-president and secretary. The new company will continue to handle the Dodge, Hudson, Wilcox and Vim.

Barnett Retires—Ira S. Barnett has retired as president of the Kentucky Automobile Co., Louisville, Ky., agent for the Cadillac. He has been succeeded by Hubert Levy, who will be assisted by Charles New, who will hold the offices of secretary and treasurer. Mr. Levy formerly held those offices, while Mr. New has been a director without taking any active part in the management. A substantial amount of the stock which had been owned by Mr. Barnett has been purchased by those now comprising the management.

Doctor Uses X-Ray on Car—Dr. V. J. Capron of Friday Harbor, San Juan County, Wash., has what is known as his X-ray automobile power house. By using a bicycle rim clamped on to the hind wheel of his automobile and then bolting the transformer used on an X-ray machine to reduce direct to alternating current which was belted to the bicycle rim. Putting power upon the transformer converted it into a dynamo, out of one side of which he could get the necessary alternating current. When he found it necessary to take X-ray photographs of injuries he simply jacked up the hind wheel and started his engine, putting in the high, throttled down as closely as possible. The combination gives him 110 volts sufficient for X-ray photography or the illumination of a thirty-candle power lamp. The surgical advantage of this simple arrangement is that a physician can carry his whole apparatus with him conveniently, instead of requiring the patient to be brought to him. When on the road the doctor unclamps the bicycle rim from the hind wheel and stows it away.

Recent Incorporations in the Automobile Field

New York

NIAGARA FALLS—Lastic Air Mfg. Co.; \$20,000; tire manufacturer. O. M. Mackie, E. M. Mackie, A. T. Stewart.
NORTH HEMPSTAD—Collins Auto Renting Co.; \$1,000; renting. H. M. Day, H. L. Collins, C. E. Collins, Great Neck Station, N. Y.
ROCHESTER—Rochester Vulcanizing Co.; tire repairing. F. E. Denley, J. M. Sill, A. C. Oip, 511 Wilder Bldg.
ROME—Bryant-Noonan Auto and Cycle Co.; \$5,000; dealer. A. S. Noonan, G. W. Bryant, A. J. O'Connor, all of Rome.
STAPLETON—Clifton Auto and Storage Co.; \$5,000. W. L. Scott, F. Scott, J. Winfield Scott, 67 Harrison street, Stapleton.
SYRACUSE—Bell-Tuttle Storage Battery Co.; \$3,000; manufacturer electrical goods, in particular for automobiles. F. G. Bell, B. H. Tuttle, A. S. Tuttle, all of Syracuse.
SYRACUSE—Cronin Garage Co.; \$1,000. C. E. Brown, J. Crinnin, E. L. Moore.
SYRACUSE—Syracuse Motor Vehicle Trade Corp.; \$2,000. F. Crosby, S. W. Munroe, G. W. Bartlett, all of Syracuse.
UTICA—National Auto Service Co.; \$100,000. A. J. Seaton, F. J. Seaton, W. H. McCarry, Pittsfield, Mass.
UTICA—Utica Automobile Trade Assn.; \$1,000. A. A. Ledermann, G. C. Donabue, W. F. Carroll.
YONKERS—Powers Rubber and Supply Co.; \$3,000; dealer in rubber goods and tires. M. C. Powers, L. M. Powers, 749 Crotona Park North, New York City; W. A. Schenck.

New York City

ARENA—Automobile Co.; \$3,000. Jacob Ballenberg, Olga Ballenberg, Joseph Ballenberg, all of 160 East 103d street.
W. H. DUNCAN Co.; \$5,000; manufacturer materials for tops, waterproof cloths, etc. M. M. Duncan, W. H. Duncan, both of Rockaway Park, L. I., and J. N. MacLean, 629 Throop avenue, Brooklyn.
CARLEND Co.; \$2,000; gasoline dealer. E. M. Grossman, C. C. Siemon, Leonard Batt.
SOLO Tire Co.; \$100,000; manufacturer. J. W. Soling, Lavinia Leitch, E. F. Price, 439 East 8th street, Brooklyn.
PHILLIPS Auto Seat Co.; \$5,000; manufacturer. N. M. Lynn, C. A. Phillips, F. A. Phillips, 248 W. 49th street.
RELIABLE Touring Car Service; \$10,000. C. L. Delehanty, Harry McGonigle, W. F. Byrnes.
ROLLER Lock Nut Co.; \$900,000; to manufacture the Wegener roller lock nut. B. J. Green, 40 Richards street, Brooklyn; A. H. Wegener, 1105 Garden street, Hoboken, N. J.; H. L. C. Wenk.
OHIO
AKRON—Double Service Tire & Rubber Co.; \$50,000; manufacturer. C. F. Geyer, M. S. Glover, David Bowlus, U. G. Welton, W. A. Nash.
ARCADIA—The Access Auto Co.; \$25,000. C. R. Simkins, E. R. Struble, F. P. Conaway, C. Wheland, R. C. Willis.
CINCINNATI—Citizens Motor Car Co.; \$150,000 to \$200,000.

CLEVELAND—Auto Rescue Service Co.; \$5,000; garage. J. Morgan, A. Cooper, P. W. Hill, Hugo Karman, N. W. Edwards.
CLEVELAND—Globe Accessories Co.; \$10,000; dealer. J. F. Engle, F. C. Brew, R. Hendrickson, C. F. Saenger, V. B. Engle.
CLEVELAND—The Ohio Gear Grinding Co.; \$10,000; machine shop. M. B. Noyes, F. J. Wing, Leo Ulmer, Max Efrea, Irene Bolland.
COLUMBUS—Eureka Mechanical Starter Co.; \$30,000. W. A. Ross, J. E. Matthews, C. E. Bonebrake, A. Bunford, C. E. Ross.
COLUMBUS—Vincent-Franz Automobile Co.; \$5,000. Henry Franz, F. L. Vincent, K. W. Rittenhouse, W. B. Lover, F. F. Little.
ELYRIA—Collsum Garage Co.; \$5,000. Otto Niemeyer, C. F. Newman, T. P. Robson, J. E. Robson, I. M. Austin.
LANCASTER—Ohio-West Virginia Motor Club Co.; \$20,000. B. F. Gayman, C. M. Trimmer, Palmer Howard, L. C. Silbach.
TOLEDO—Meyer Auto Repair Co.; \$2,000. Carl Meyer, C. O. Quelecke, E. J. Beeman, G. F. Hahn, T. Wooster.

Virginia

RICHMOND—M. D. Stone Motor Co.; \$50,000; automobile business. M. D. Stone, Pres.; F. H. Dula, Secy. and Treas., both of Richmond.

Washington

SEATTLE—Metropolitan Garage; \$2,000. J. F. Douglas, N. E. Felt, E. H. Sennett.
SEATTLE—Geo. W. Miller Co.; \$25,000; general automobile business. George W. Miller and W. H. Sanders.

Recent Developments in Field of Dealer and Repairman

Remy's Atlanta Factory Branch—The Remy Electric Co. has established a factory branch at 14 West Harris Street, Atlanta, Ga.

Knight Tire in Spokane—The Automobile Tire Shop, Spokane, Wash., has secured the agency for the Knight line of tires for Spokane.

Dallas Haynes Moves—The Dallas branch of the Haynes Automobile Co. has moved into handsome new quarters at 2215-2217 Commerce Street.

Buick Agency Moves—The Buick agency at Providence, R. I., has moved to a new location on Broad Street, where it has better facilities for handling the line.

Baltimore Falls Tire Agent—G. E. Blaylock, 1817 Maryland Avenue, Baltimore, Md., has the local agency for the Falls tire manufactured at Cuyahoga Falls, Ohio.

Hercules Tire in Los Angeles—The Roddan-Latimer Sales Co., Los Angeles, has opened a tire house at 1046 South Olive Street with exclusive selling rights for Hercules tires.

Mohawk Tire in Louisville—The Southern Motors Co., 615 South Third Street, Louisville, Ky., has acquired the agency for Mohawk tires.

Handles Baltimore O'Neil Protector—A. P. Moessinger, 127 Richmond Street, Baltimore, Md., is the local distributor of the O'Neil outer tire made by the O'Neil Tire & Protector Co., Akron, Ohio.

Ever Ready Battery Agent—The Erner Electric Co., Cleveland, Ohio, has been appointed agent for the American Ever Ready storage battery. A service station has been established at 1268 Euclid Avenue.

Longuemare Carbureter Moves Salesroom—The Longuemare Carbureter Co. has moved its salesroom from 246 West Fifty-ninth Street, New York City, to new and larger quarters at the Motor Mart Bldg., 1876 Broadway.

Sewell Cushion Wheel in Buffalo—The Sewell Cushion Wheel Co. has opened a Buffalo branch with A. W. Sewell in charge. This is the eighth branch office the concern has established, and it is stated that another is to be opened in St. Louis.

N. Y. Swinehart Moves—The Swinehart Tire and Rubber Co., New York City, now at 1924 Broadway, will move to 41-43 West Sixty-third Street, the building formerly occupied by the Bryant Motor Service Corp. and the Knickerbocker Garage.

Two Federal Rubber Branches Now—The Federal Rubber Mfg. Co., Milwaukee, which recently established a direct factory branch and service station at 509

Broadway, Milwaukee, has established a second Milwaukee branch, to serve the South Side, at 361 Eleventh Avenue.

Kansas City Change—Russell H. Clark & Co. have succeeded to the business of the Simon Bros. Mfg. Co., 1529 Oak Street, Kansas City, Mo. Mr. Clark was for several years manager for the Simon company, which made automobile tops and handled small repairs.

Recent Louisville Trade News—The R. A. Thornton Auto Co. has opened a repair shop for Ford cars at 915½ South Third Street, Louisville. The Martin Motor Co., which has acquired the agency for the Velie, has opened an office and salesroom at 437 South Second Street. W. C. Martin of New York is head of the concern. The Two in One Tire Co. has opened a shop and office at 323 West Market Street, Louisville, Ky. This concern takes two old casings, cleans off the rough places, cements the two together, sews two or three rows of stitches around the edge, and turns out a tire which it is claimed is good for 2500 miles.

Kansas City Tire Co. Moves—The Tire Service Co., Kansas City, Mo., Henry Winter, manager, is moving from 1621 Grand Avenue to 1606 McGee Street into a one-story building now being completed, leased for five years. After two years a second story is to be added for the tire company. It is agent for the Pennsylvania tire in Kansas City and does a general tire-service business.

Recent N. Y. Leases—The Ford Commercial Body Co., New York City, has leased the store and basement at 10 West Sixtieth Street. The store and basement at 1674 Broadway, has been leased to the McAllister Tire Co. The Taxicab Assn. and the Town Taxicab Co. has leased the entire building at 243 West Sixty-fourth Street, New York City. Space at 1896 Broadway has been leased for the Oakland Motor Car Co.

Late Baltimore Trade News—The Poehlmann Automobile Co., Baltimore representative of the Chevrolet, is in its new building at Cathedral and Chase Streets. The new quarters are fireproof throughout, four stories high. The machine shop is on the fourth floor, where plenty of light may be had.

The Pneumatic Tire & Rubber Co., Baltimore representatives of the Racine tires, has entered its new place, 23 West North Avenue. The company is operated by F. J. Rowe and C. M. Green.

Late Hartford Trade Items—The U-Auto-Varnish Co., 2 American Row, Hartford, Conn., has established a service station in the rear of 1125 Main Street, East Hartford, Conn.

The Britton Co., 121 Allyn Street, Hartford, State distributor of the

Stearns-Knight, has established the following sub-agencies: H. E. Bradford, Waterbury, Conn.; F. W. Roberts, Northampton, Mass., and R. H. Britt, Springfield, Mass.

F. L. Caulkins, Middletown (Conn.) Chalmers distributor, has taken on the Dodge in Middlesex County, operating under the Hartford Motor Car Co., 410 Main Street, Hartford.

The Hartford Auto Painting Co., now located in the Kingsley & Smith garage on Elm Street, has leased the top floor of the new Hartford Motor Car Co. building in the rear of the salesroom at 410 Main Street.

Recent Milwaukee Trade Notes—The Alben Co., Twenty-seventh and Wahl Avenues, Milwaukee, is marketing a new portable jack and crane for use in garages. The combination instrument lifts any car up to 5000 lb. to a height of 9 ft. and weighs only 300 lb.

The Racine Auto Tire Co., Racine, Wis., manufacturing the Racine Horse-shoe tire and other rubber goods, has established a branch depot and distributing station at 140 Oneida Street. W. M. Smith of Milwaukee has been appointed manager. The branch will handle all Wisconsin business.

The Badger Tire Repair Co., State agent for the Kelly-Springfield tire, and operating a large tire-repair shop at 454-457 Jackson Street, Milwaukee, has moved to new and larger quarters at 142-144 Oneida Street.

The Dayton Rubber Sales Co., 290 Fifth Street, has moved to new and larger quarters at 415 Cedar Street. The concern is State distributor of the Dayton airless tire and Dayton pneumatic tire and operates a large repair shop.

A new supply and accessory store has been established at 427 Chestnut Street, Milwaukee, by L. Baum & Sons.

S. G. V. in New Home—The S. G. V. Co., Newark, N. J., formerly located on Lafayette Street, has moved into its new home, the Colyear Building, 500-504 Central Avenue. The company has leased the premises for a period of six years. The salesroom will occupy the first floor and on the second floor there will be a service station and machine shop. The third floor will be given over to an assembling department, and the body building department and paint shop will be on the fourth floor.

The company is now going through the process of incorporation under the laws of New Jersey. G. A. Grant, the manager of the company, says that the objects of the new company are to maintain the service of cars manufactured by the S. G. V. Co., Reading, Pa., and to build new cars under the new organization.

Royal Equipment Adding—The Royal Equipment Co., Bridgeport, Conn., will add a third story to its 60 by 200-ft. factory.

Whitfield Takes Stearns—N. B. Whitfield of New Haven, Conn., has just secured the agency for the Stearns car in that territory.

Rider Opens Office—Cleremont Rider, western distributor of the H. & D. shock absorber, has opened an office at 3667 Olive Street, St. Louis, Mo.

Polson's New Plant—The Polson Mfg. Co., Buffalo, N. Y., will build a two-story, 85 by 100-ft., reinforced concrete plant at Main Street and Lafayette Avenue.

Philadelphia Tire Co. Moves—The Kelly-Springfield Tire Co., Philadelphia, Pa., has removed from 208 North Broad Street to 257-259 North Broad Street.

Opens Battery Station—The Battery Service Co., St. Louis, Mo., has opened a station at Twenty-third and Locust Streets, where it will render all day and night service.

Chevrolet Assembling Plant Contemplated—The Chevrolet Motor Co., Los Angeles, Cal., contemplates building an assembling plant and machine shop near Los Angeles, Cal.

Interstate in Marion—F. D. Bentz has taken the agency for the Interstate in Marion, Ohio. After Sept. 15, the garage and salesrooms will be located at Main and Church Streets.

Opens in St. Louis—The Uniplex Construction Mfg. Co., St. Louis, Mo., has opened a salesroom at 2314 Locust Street. The company makes and retails the Uniplex knock-down garage.

Ten Broeck Agency Moves—The Ten Broeck Tyre Sales Co., Louisville, Ky., has closed its downtown store at 542 South Third Street and moved its salesroom to the factory at Twenty-sixth and Courtney Streets.

Los Angeles Pullman Moves—The Aston Motor Car Co., Los Angeles, Cal., southern California distributor of the Pullman, is located at 1310-12 South Grand Avenue in the large building formerly occupied by the Mission Motor Car Co.

Distribute from St. Louis—The Schoellhorn-Albrecht Machine Co., 416 North Main Street, St. Louis, Mo., has been appointed distributor for the Imperial and Marion in eastern Missouri and southern Illinois. The Jeffery Motor Sales Co. will handle both lines in St. Louis and will continue as distributor of the Jeffery lines.

Philadelphia Co. Takes on Oakland—The Baker-Bell Motor Co., 665-669 North Broad Street, Philadelphia, Pa., has taken over the local retail business and service department and the wholesale business for Bucks, Montgomery, Chester, and Delaware Counties in Penn-

sylvania, and Camden County in New Jersey, of the Oakland Motor Co.

Hercules Tire in Ore.—Hercules Tire Sales Co., Portland, Ore., has been formed by Noah Frederick and H. J. Nielson and established themselves as distributors of Hercules tires for the entire State of Oregon. They have opened headquarters at 302 Oak Street.

New Haven White Adds Chalmers—The White Motors Co. of New Haven has recently been appointed Chalmers distributor for New Haven County, with the exception of Meriden. In addition to the Chalmers the White company handles White and Buick passenger and commercial cars. The company has engaged the service station operated by the W. A. Maynard Co., the former Chalmers agent.

Handling U. S. Tires in Nine Cities—The Quick Tire Co. is now operating in nine cities as follows: Dallas, San Antonio, Houston, El Paso, Fort Worth, Little Rock, Memphis, Louisville and Nashville. Dallas is the pioneer Texas city in which the concern established a business. It was recently incorporated and is handling United States tires exclusively. Its officers are: Thornton Newsum, president; R. B. Young, vice-president and treasurer, and H. L. Williford, secretary.

Late Columbus Trade Items—The Central West Motor Car Co., Columbus, Ohio, has been organized with G. W. Carroll, general manager, and A. E. Aull, manager of sales, to handle the Oakland and Abbott-Detroit in central Ohio territory. The concern occupied new salesrooms and offices at 80-82 North Fourth Street.

S. W. Schott & Co., central Ohio distributors for the Empire, has placed the sub-agency for Knox and Licking Counties with the Anderson Motor Sales Co., which will have headquarters probably at Newark, Ohio.

Anthony Appoints New Packard Agencies—The increased production of the Packard factory has enabled Earle C. Anthony, Inc., Packard distributors throughout southern California, to establish sub-agencies in the more important southern California centers. In the past practically all Packards sold in this end of the State were sold at retail by the Anthony organization, but with his increased allotment, Anthony has announced the following sub-agencies: Bakersfield, W. F. Gouty; Riverside, Riverside Motor Car Co.; Long Beach, Arthur E. Evans; Monrovia, A. T. Badillo; San Luis Obispo, C. H. Kamm; Ventura, R. M. Seeley; Santa Barbara, Oscar Fitch; Anaheim, Rockwell & Sidnam.

Denver Announcements—The Wilson Auto Co., 801 Broadway, Denver, Chander distributor, has taken the State

agency for the Empire and also the Denver agency for the National.

L. G. Palmer, Paige distributor for Colorado, has closed his salesroom at 1515 Cheyenne Place, and announces that he will retire from the automobile business. The Paige agency has not yet been taken by any other dealer.

L. M. Patrick, 533 Marion Street, has just taken the agency for the Lewis car.

Hoiser Bros. have taken the agency for the Velie, and have opened a salesroom at 1236 Broadway.

The Hupp Motor Sales Co., Colorado distributor of the Hupmobile and Locomobile, is moving from 220 Sixteenth Street, Denver, into its new building at 1260 Broadway.

The Auto Sales Co., a new \$25,000 corporation, has opened a used car and rental business at 1840 Walton Street, and also a garage and a separate filling station. H. W. Curtis is manager.

Late St. Louis Trade News—The St. Louis branch of the L-Ty-To-Co., which handles a special preparation for the treatment of tires, has opened a salesroom at 1135 Locust Street, with G. R. Hutchings in charge. The company formerly had only offices here at 428 Frisco Bldg. The Koochook Rubber Co., handling automobile supplies, will move within the next few weeks from 3152 Locust Street to 1120 Pine Street.

The Best Service Truck Co., 1120 North Twelfth Street, has been appointed Southwestern sales representative of the Gramm-Bernstein Co. The St. Louis agency for Saxon cars has been transferred from the Page Automobile Co. to the Frye Motor Car Co., of 3333 Locust Street. This agency's territory includes the southern half of Illinois and the eastern half of Missouri. G. A. Root will supervise the country sales of Saxons and of Paige cars, for which the Frye company also has the local agency.

The United Sales Co. has been organized to handle the United States tires in St. Louis. The new concern is fitting up salesrooms at 3567 Lindell Avenue and will render a twenty-four-hour service. The officers are E. G. Niggeman, president; G. J. Breaker, treasurer, and F. C. D. Dobson, secretary and manager. The Paterson, formerly handled in the St. Louis district by the Bleck Automobile Co., henceforth will be sold here by the Donovan Automobile Co. The latter recently discontinued the Interstate. The Brisk Blast Mfg. Co., maker of tire pumps, has opened a plant at 1515-1527 North Twenty-first Street.

The Tate-Gillham Motor Car Co. has opened a service station and salesroom in the Gorlock Bldg. at Webster Groves. The Commercial Auto Body Co., now at 3003 Locust Street, has leased a four-story building at the southwest corner of Sixteenth and Pine Streets for a number of years.